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STEEL

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As the Editor Views the News

■ A WHOLESOME sign of the times is the more understanding approach that is being made on employer-employe relationships. Last week the National Industrial Conference board (p. 29) announced a prize contest in which cash awards will be made to foremen contributing the best suggestions as to how to build morale in working forces. When the General Electric Co. last week distributed awards for notable contributions to the company's progress, four workmen and three foremen participated. One (p. 19) went to a millwright whose 127 suggestions resulted in 78 improvements in manufacturing methods. In reporting to employes, Blaw-Knox Co.'s president (p. 19) classes it as "a report, not from the boss, but about his business," and points out that "the boss" is the company's 9077 stockholders.

• • •

Production Steady

Steel production (p. 17) continues unchanged at 55 per cent of ingot capacity, despite the fact new business is not materializing in certain directions as rapidly as expected. Indications are that the automobile trade bought at the low prices of last fall (p. 27) for a longer period ahead than was apparent, so that no further large-scale buying is expected before late March or early April. . . . Industrial construction this year, according to STEEL'S survey (p. 15), will not be as high as previously estimated. It will be about 30 per cent above the 1938 volume, but only about 43 per cent of that in 1929. Expansion will be chiefly in the utilities, the shipbuilding, aircraft and oil industries. But there is a good prospect for investment in modern equipment.

• • •

"Invite" Steelmen

Leading steel companies have been invited by the federal trade commission (p. 19) to be represented at a hearing on the steel industry this week before the temporary national economic committee. . . . Senate military affairs committee (p. 26) on Friday favorably reported a bill for accumulation of stockpiles of strategic materials of war that are obtained mainly from abroad. . . . A Pittsburgh steel foundry (p. 19) has requested CIO's permission for a 15 per cent temporary wage cut. . . . Administrator Andrews holds the wages-hours act (p. 24) will result in wider adoption of guaranteed annual wage arrangements. . . . War department is evolving a plan (p. 26) for producing 1000 military planes a month. . . . Ship-to-shore telephone service (p. 20) will be inaugurated on 100 additional lake carriers this year.

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Trains Employes

This week's contributor to STEEL'S Forum on Re-Employment (p. 34) is Henry P. Chaplin, Cone Automatic Machine Co., Windsor, Vt. He believes with the governor of Vermont that "there is no substitute for a good job in private industry." This company gets good results from a highly-developed education system which trains employes for the more responsible positions. . . . A carefully engineered feature at the new Irvin works (p. 36) is the huge industrial piping system. This includes steel, wrought iron, lead, copper, rubber and glass pipes in diameters up to 48 inches. . . . In the manufacture of squirrel-cage motors, various advantages are derived (p. 38) by using the pressure casting method for assembling rings, bars and ventilating fans in one piece.

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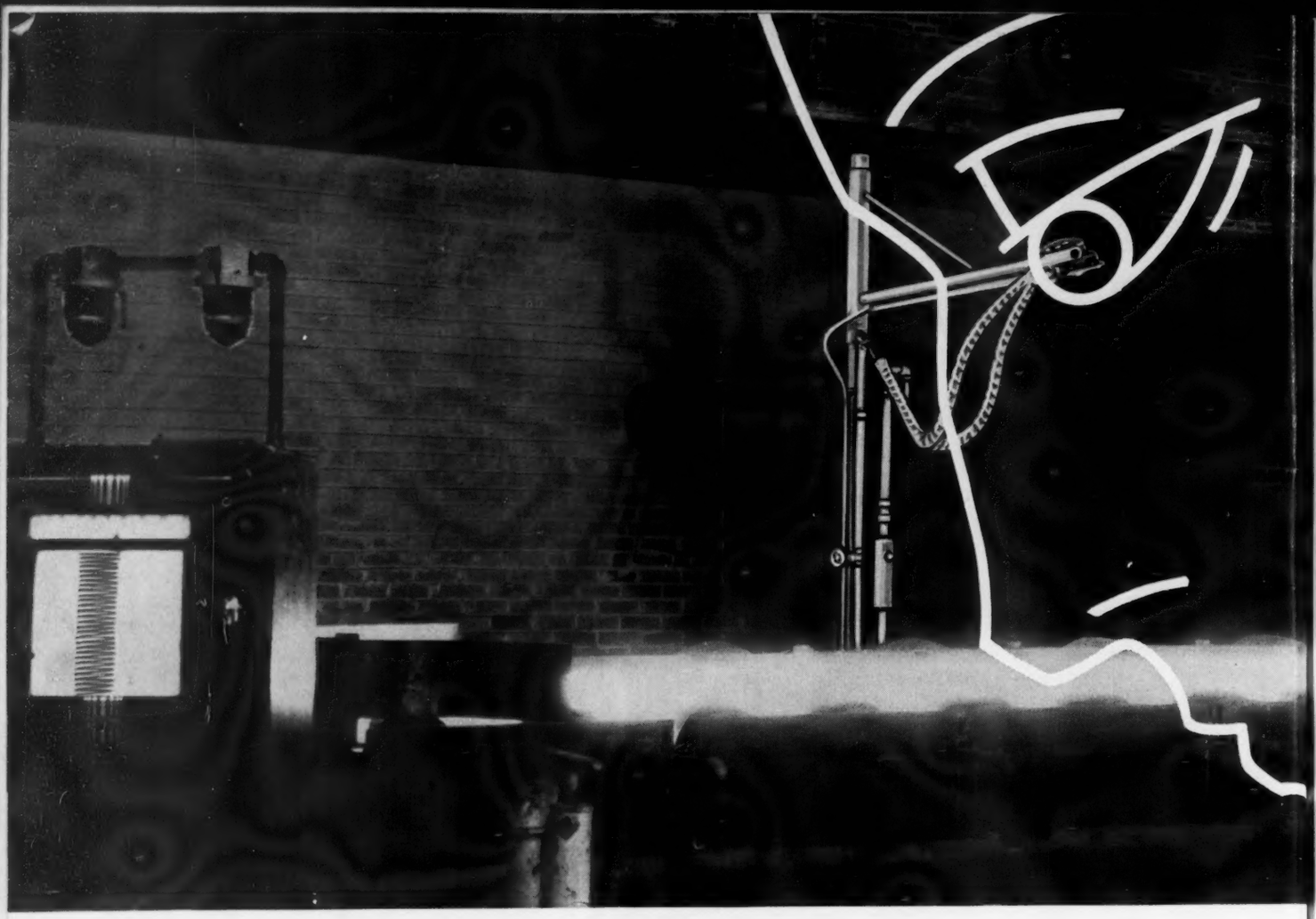
Reduces Costs

New applications for the oxyacetylene torch (p. 40) continually are found in steel mills and result in cost reductions. . . . Intricate and vari-colored designs which formerly could be reproduced only on paper now can be applied (p. 47) on metal sheets by new high-speed printing presses; resulting finishes are not marred in subsequent fabrications. . . .Steel-hulled pleasure cruisers (p. 48) now are produced successfully by arc welding. . . . A retractible monorail crane (p. 52) has reduced costs in unloading bundles of sheets from trucks at a filing cabinet manufacturing plant. . . . Copper-steel sheets are used by an Iowa fabricator (p. 53) in making soil erosion checks. . . . Recent exports include a 2500-ton hydraulic press (p. 57) which will be used in France for forming airplane parts out of duralumin.

E C Kreutzberg



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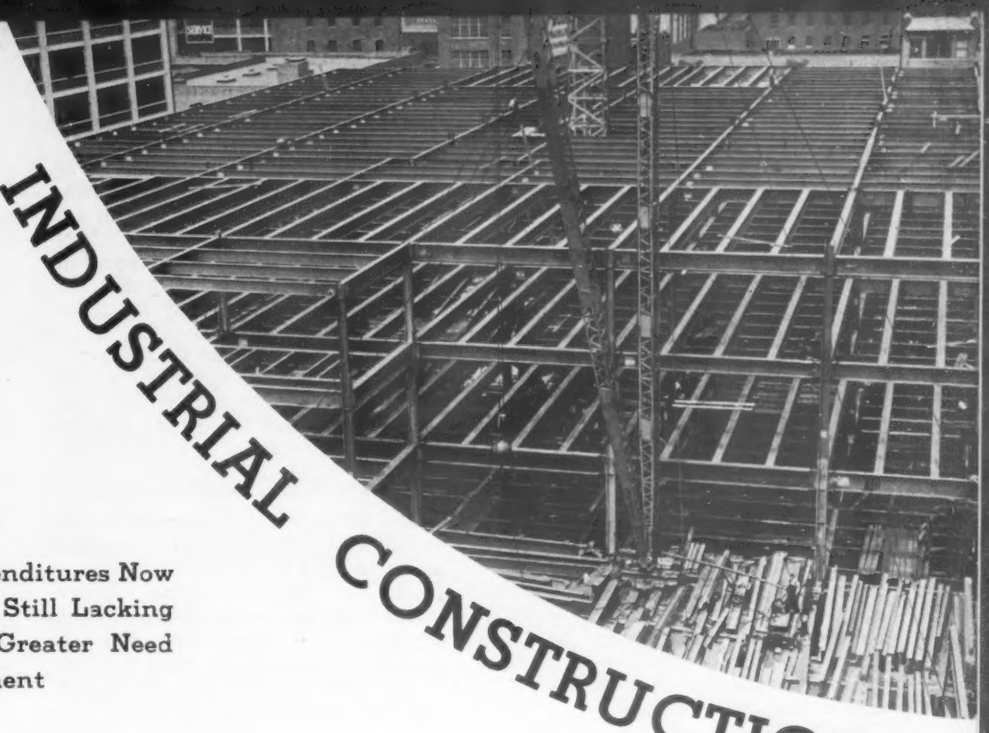
SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS



INDUSTRIAL CONSTRUCTION

■ 30 Per Cent Increase in Expenditures Now Estimated for Year—Incentive Still Lacking for Widespread Expansions—Greater Need Seen for New Equipment

■ INDUSTRIAL building and expansion in 1939 will be about 30 per cent greater than in 1938, according to revised consensus of engineers, contractors and architects serving key industries. Concurring in this estimate is the bureau of foreign and domestic commerce.

Such a gain, considering the low volume in 1938, would not be impressive, and represents a downward revision from estimates made last November and December when some observers saw an increase of as much as 85 per cent.

Factory building in 1938 aggregated $250,000,000, according to department of commerce estimates. A 30 per cent increase would bring the total to approximately $325,000,000 in 1939, or about 43 per cent of the 1929 figure, $760,000,000. In 1932, such construction totaled only $95,000,000, as shown in an accompanying chart.

Several factors continue to operate against widespread industrial and productive building. Factory construction is directly responsive to industrial earnings trend, and 1938 was far from a big-profit year. The notable improvement since the middle of last year, however, encourages prophecies for a 30 per cent improvement.

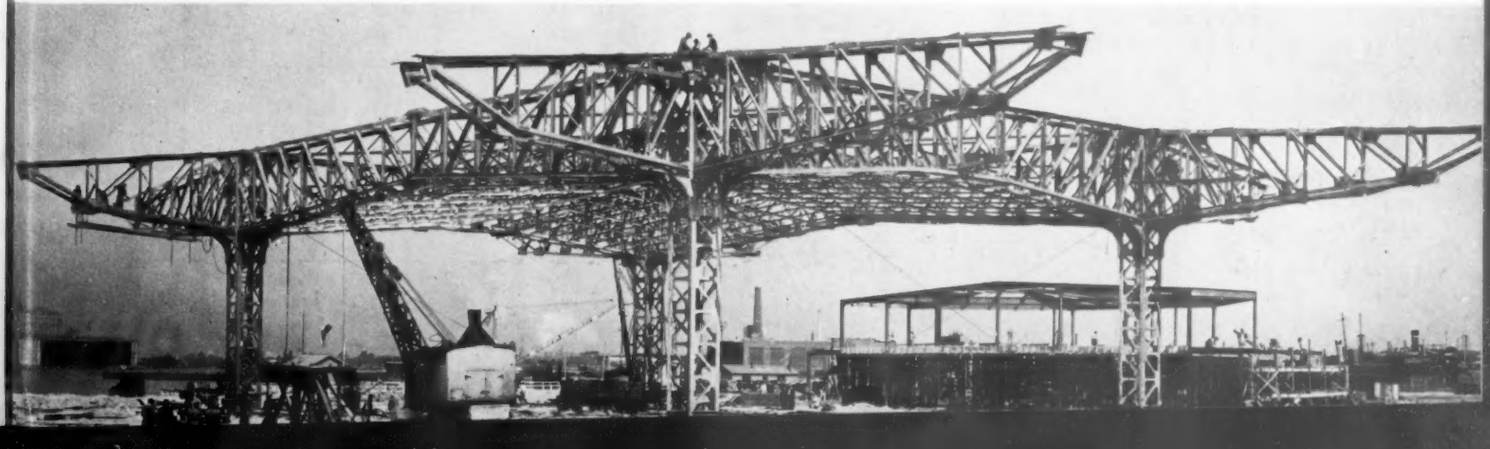
Investment capital remains timid; confidence in the administration's attitude toward private enterprise still is lacking. Without assurance that a reasonable return is probable and the original investment at least protected, there appears to be little incentive to invest in capital projects. While congress' attitude appears more favorable to industry, recent indications point to intensified conflict between congress and the President.

A third factor is that certain basic industries are equipped with sufficient plant space to meet the expected moderate increase in demand for their products. The steel industry, for example, has completed or is completing major expansion and rehabilitation programs; considerable improvement in operations will be necessary before capacity now idle will be fully utilized. The automotive industry, which demonstrated capacity to build at least 5,000,000 cars a year in 1937, and which has completed some building since, is unlikely to experience a demand so great as to necessitate further widespread construction programs.

Notable exceptions are shipbuilding, aircraft, and some industries manufacturing light consumer goods. In general, however, capital investment is more likely to be applied to new and improved machinery and equipment designed to permit more economical production, rather than new construction.

National defense plans will neces-

■ Conspicuous in industrial construction at present are numerous aircraft plants. While few airport hangars are under way, they require large steel tonnages. One now being designed for government will take 8000 tons. Below, unusual roof structure for Pan American Airways Inc.'s new hangar in Baltimore. Because of high foundation costs, this was designed with four columns, roof being cantilevered from them. Building is practically all steel, including doors, height of which is 35 feet, extending 240 feet on southwest face, 160 on northwest



sitate expansion in shipyards and aircraft factories. Already greater facilities for shipbuilding at navy yards are being built. These involve thousands of tons of structural steel and a large amount of machinery and equipment.

Private yards also are expanding. Bethlehem Steel Corp. is expected to spend close to $2,000,000 in enlarging shipbuilding facilities incident to the construction of a battleship.

Aircraft builders have under way or projected a number of plant additions, although this building has not reached the spectacular proportions expected in some quarters. This type construction may be accelerated by orders for planes from foreign countries and by further enlargement of the United States' defense program. Here again the apparent greatest immediate need will be for new tools and equipment.

Plant expansion programs already underway or scheduled for 1939 by aircraft and parts builders include: Glenn L. Martin Co., Baltimore, $2,750,000; Julian P. Friez & Sons Inc., Baltimore, division of Bendix Aviation Corp., $500,000; Dart Mfg. Co., Sandusky, O., $200,000; National Aircraft Corp., Ft. Worth, Tex., $100,000; Ryan Aeronautical Corp., San Diego, Calif.; Beech Aircraft Corp., Wichita, Kans.; and Howard Aircraft Corp., Chicago.

The machine tool industry has a number of moderate or small programs planned or under way, impetus being provided by the defense program.

In several industries, extensive expansion programs await final results of research now underway. For example, a large mill to produce white news print from southern pulp is planned in Texas. Paper production in the South generally has been restricted to the heavier types of bag and wrapping paper, but research by a leading paper and pulp interest indicates news print may be satisfactorily made.

The A. P. W. Paper Co., Albany, N. Y., has tentative plans for a mill at Jacksonville, Fla., which with machinery will cost more than $1,000,000.

Oil Industry Delays Building

New oil refining processes, now in an advance experimental stage, are likely to hold up some construction plans for the immediate future. Should further research prove these processes as revolutionary and successful as expected, a sharp increase in oil industry building should follow. Several large building programs already have been announced. Maintenance construction work is scheduled at a normal pace.

Textile industry expansion likely will depend on developments in the chemical branch, revolving about rayon. Du Pont interests are planning a large factory at Seaford, Del., for manufacturing synthetic fibre, and another near Radford, W. Va., at which the yarn and basic materials for its manufacture will be produced. These plants will require a $12,000,000 expenditure.

Known as Nylon, the synthetic fibre is a protein product of superior strength, toughness and elasticity, procured from such basic raw materials as bituminous coal, air and water. It is expected to offer serious competition to pure silk for many uses. Production on a large scale will not be attained until next year.

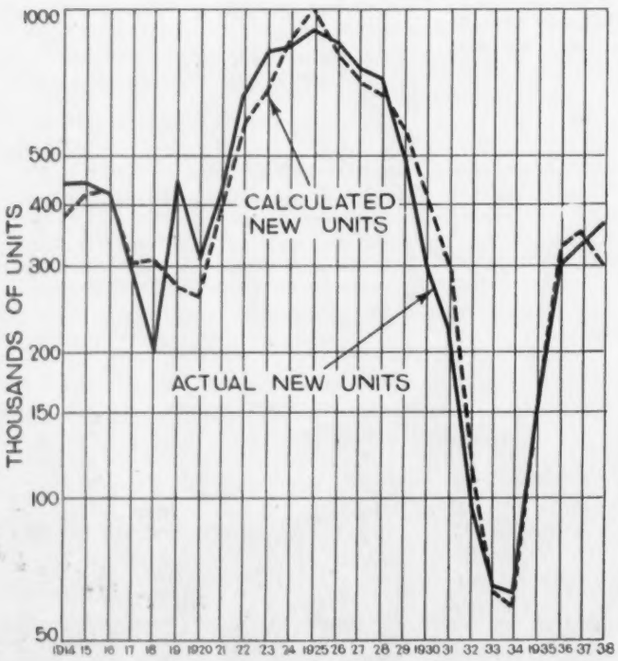
As result of its development, textile construction mainly will be for new units to produce yarn for present finishing plants. Many of the latter plants are in need of new equipment.

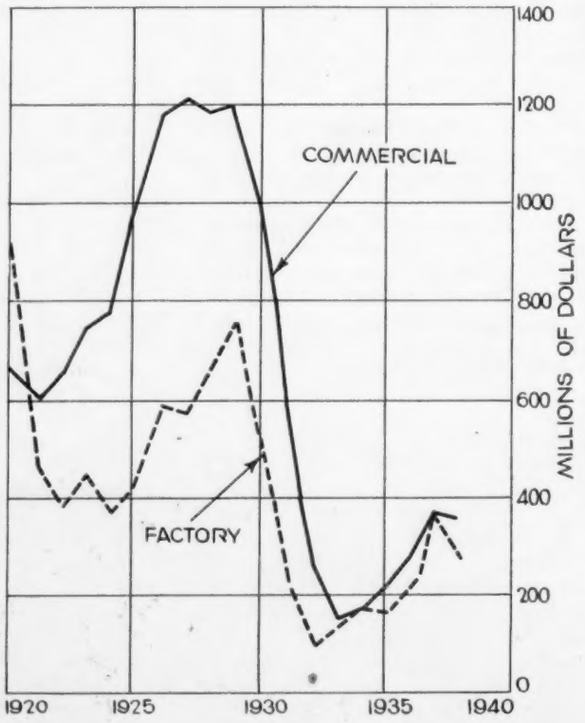
For conventional textile manufacture, an increase in equipment, not construction, is indicated.

The automotive industry will contribute a fair share this year. Fisher Body Co. is building a press and die shop at Grand Rapids, Mich., requiring 2525 tons structural steel. Ford Motor Co. is building a new plant at Long Beach, Calif. A number of parts plants are scheduled, but major additions to assembly units are not contemplated.

The steel industry will spend an estimated $126,000,000 for new construction and equipment (STEEL, Feb. 20, p. 17), a decrease of about

■ **Residential building will increase about 40 per cent in 1939, estimates the bureau of foreign and domestic commerce, considering such factors as number of families, income, ownership costs and market conditions. Urban residential construction, actual and calculated, is charted at lower left. Commercial building, which reached $1,200,000,000 in 1927, dropped to about one-tenth that in 1933 (lower right), is not expected to show any great increase over the $350,000,000 total for 1938. Factory building for 1939 is expected to increase 30 per cent, or to about $325,000,000. Chart data from bureau of foreign and domestic commerce**





25 per cent from the 1938 budget. Modernizing existing equipment is the principal item in the industry's program.

Utilities, notably power companies, will be considerably more active. They follow to large extent the earnings record and service demands, and it is likely that during the coming year they will share in the plant building increase, particularly in view of the deferred expansion of light and power facilities in some areas, and a possible program of expansion to meet wartime mobilization needs. They are, however, still adversely affected by the government's attitude.

Commonwealth & Southern's program calls for $30,000,000 expenditures. Public Service Electric & Gas Co., New Jersey, will spend about $25,000,000; the New York Electric & Power Co., Buffalo, will spend close to $9,000,000; Southern California Edison has a $5,000,000 program, mainly for building.

Little is expected from the brewing and distilling interests, production and warehouse facilities having been well rounded out in the years since repeal. Shoe and leather industry is expected to have a busier year but has sufficient plant to accommodate the expected increase.

Chemical Field Expanding

The larger chemical companies have carried on progressive construction programs without much regard to current operations. Monsanto Chemical Co.'s program, launched in 1937, was carried through 1938 without perceptible slowing, despite deceleration of business. This year will witness comparable activity. Sites where the construction will take place has not been definitely decided, with the exception of Springfield, Mass., where an enlargement of the Shawinigan Resins plant is under way, and in Monsanto, Ill., where the company is building two plants.

Residential building prospects are brighter. Nathanael H. Engle, assistant director, bureau of foreign and domestic commerce, last week predicted an increase of "possibly 40 per cent" over 1938.

"This appears likely," he said, "because of the low vacancies, recent increases in family income as indicated by the index of income payments prepared by our bureau, the substantial increases in the number of families each year, the assistance in reducing home financing costs under the FHA program, and the extensive program of public housing construction under the United States housing authority."

In residential construction, the long range outlook also is good, according to Mr. Engle. He estimates 600,000 homes a year for the next five years are needed. This compares with 350,000 units in 1937, and 380,000 units in 1938.

Approximately 4 tons of steel products are required for the average small home, and if Mr. Engle's prediction is realized, homebuilding promises an annual market of 2,400,000 tons of steel.

Commercial building, on the other hand, presents a gloomier picture. A close relationship has been found to exist between the construction of commercial buildings and the percentage of occupancy of existing office buildings. Since vacancies now are rather high, any large increase in such building is unlikely. There may, of course, be notable local exceptions.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 25	Change	Same week 1938	Same week 1937
Pittsburgh	48	+ 1	28	87
Chicago	53.5	+ 1	24.5	80.5
Eastern Pa.	37	None	30	56
Youngstown	47	+ 2	29	81.5
Wheeling	68	+ 2	38	94
Cleveland	54	— 2.5	31	79.5
Buffalo	32.5	— 2.5	21	86
Birmingham	83	None	61	77
New England	70	None	27	97
Cincinnati	55	None	35	64
St. Louis	55	None	28	82
Detroit	86	— 3	43	97
Average	55	None	30.5	84

HARVESTER CO. TO SPEND $3,000,000 AT MILWAUKEE

International Harvester Co. will spend approximately $3,000,000 in the next 18 months to modernize and rearrange its Milwaukee plant. Program includes complete rehabilitation of the Milwaukee foundry to equip it for specialization in producing large castings. It does not include any new factory building construction.

Earlier the company announced it will spend $5,000,000 at its tractor works, Rock Island, Ill., and about $1,000,000 to complete a foundry at its motor truck plant, Indianapolis.

WOODWARD IMPROVEMENTS TO COST $170,000

Woodward Iron Co., Birmingham, Ala., is starting a $170,000 improvement program, to include relining a blast furnace and $40,000 for an ore crusher.

■ Restaurants, hotels, hospitals, clubs and other "institutions" will spend approximately $2,500,000,000 for remodeling, re-equipping and refurnishing in 1939, according to a recent survey by *Institutions*, Chicago publication. It is indicated 75 per cent of institutions will spend more this year than in 1938.

PRODUCTION

■ STEELWORKS operating average last week was unchanged at 55 per cent, compared with 30.5 per cent in the corresponding week last year, and 84 per cent for the week in 1937. Small increases were made in four districts, declines in three.

Youngstown, O. — Advanced 2 points to 47 per cent, with three bessemers and 40 open hearths in production. The same rate is indicated for this week. Active blast furnaces number 13.

Cleveland—Curtailment by a leading producer caused a reduction of 2.5 points to 54 per cent, lowest since the first week in January.

Chicago—Gained 1 point to 53.5 per cent, highest since fourth week of December. All independent producers are operating above 65 per cent. Increase of 1 point by a leading interest was the largest factor in the rise.

Cincinnati—Steady at 55 per cent for the fourth consecutive week, the same schedule expected this week.

Detroit—Down 3 points to 86 per cent, 21 open hearths active. This is the lowest rate since the beginning of the year.

St. Louis—Held at 55 per cent for the second week, the highest level since the middle of October, 1937.

Buffalo—Lost 2.5 points to 32.5 per cent, lowest since middle of last July.

Birmingham, Ala.—Unchanged at 83 per cent, 19 open hearths active.

Central eastern seaboard—Continued at 37 per cent, highest since middle of December.

Pittsburgh—Rose 1 point to 48 per cent. Carnegie-Illinois Steel Corp. has lighted another blast furnace at Duquesne works, the second stack added within a week.

Wheeling—Increased 2 points to 68 per cent, highest since last October.

New England—Steady at 70 per cent.

January Foundry Equipment Orders Down

■ Foundry equipment orders in January were less than in December, but higher than in January, 1938, according to the Foundry Equipment Manufacturers' association, Cleveland. Indexes based on 1922-24 show the following comparisons:

	Jan. 1939	Dec. 1938	Jan. 1938
Net orders	122.3	141.8	76.8
Shipments	96.3	102.8	147.7
Unfilled orders	151.4	126.0	147.7
3 mos. av. gross orders	118.0	106.5	160.5

FINANCIAL

COLORADO FUEL REPORTS FOURTH QUARTER DEFICIT

■ COLORADO FUEL & IRON CORP., Denver, reports a net loss for fourth quarter last year of $661,909, compared with net loss of $941,019 in the period in 1937. For the six months ended Dec. 31, it had a deficit of $805,661, while for the fiscal year ended June 30, 1938, a net loss of $829,363 was reported.

PITTSBURGH STEEL'S LOSS PLACED AT $680,531

Pittsburgh Steel Co., Pittsburgh, tentatively reports a net loss of $680,531 for 1938, after charges for depreciation and depletion of $1,398,713, but before a special charge to income account of $97,978.

EARNINGS STATEMENTS

Woodward Iron Co., Woodward, Ala., reports 1938 net earnings as $532,880, equal to $1.97 a share. This compares with $1,177,512 profit for 1937, or $4.41 a share.

♦

Superior Steel Corp., Pittsburgh, reports net loss of $291,674 for the 12 months ended Dec. 31, compared with a net profit of $239,525, or $2.11 a share on 113,276 shares, in the preceding year. Frank R. Frost, president, reported the company was "in the black" in fourth quarter.

♦

Consolidated Steel Corp. Ltd., Los Angeles, for the year ended Dec. 31 had a net profit of $102,481, equal to 72 cents a share on the $1.75 preferred stock, on which there was a dividend arrearage of $4 a share at the close of the year. This compares with a net profit of $435,593, or $3.06 a share in 1937.

♦

Wellman Engineering Co., Cleveland, had a net profit of $38,958 in 1938, compared with $97,108 in 1937. Total billings last year were $1,398,533 and operating profit, excluding federal taxes, was $50,149. Stockholders have approved a recapitalization plan whereby each present preferred share will receive 20 shares of new no-par stock, with a stated value of $5, and each present common share will be exchanged for the new stock on a share-for-share basis.

♦

Harrisburg Steel Corp., Harrisburg, Pa., reports a net loss of $18,781 for 1938, compared with a net profit of $320,312 in 1937. Inventories on hand Dec. 31 valued at $463,851 were moderately lower than a year prior. Taxes paid in 1938 totaled $66,722.

♦

Blaw-Knox Co., Pittsburgh, reports a net profit of $145,601 for the 12 months ended Dec. 31, equal to 11 cents a share on 1,334,448 shares of capital stock outstanding. This compares with a net profit of $2,379,692, or $1.78 a share on the like number of shares, for 1937. The company's net profit for the last half of 1938 was $96,713, nearly double $48,888 earned in the first half.

Consumers' Net Earnings Show Sharp Decline

■ TOTAL net income of 75 companies among equipment manufacturers, suppliers and other leading iron and steel consumers last year aggregated $62,503,508, or 38.3 per cent of the $163,027,634 net profit reported by the identical companies in 1937. STEEL'S tabulation, Feb. 13, page 30, included 25 companies, while the subjoined table lists 50. Nineteen of the 75 companies reported a loss last year, whereas only four had a loss in 1937. In the following tabulation all figures are net income, except where asterisk denotes loss.

	1938	1937
Square D Co., Detroit	$ 403,799	$ 1,062,773
Mullins Mfg. Co., Salem, O.	534,498*	533,143
Baldwin Locomotive Works, Philadelphia	1,032,641*	407,377
Detroit Steel Products Co., Detroit	173,288	787,174
Detroit Gray Iron Co., Detroit	67,286	40,986
New York Air Brake Co., New York	170,623*	935,757
Chicago Rivet & Machine Co., Chicago	31,799	207,960
Continental Roll & Steel Foundry Co., East Chicago	213,393*	984,966
Great Lakes Dredge & Dock Co., Chicago	2,213,030	1,148,153
Chain Belt Co., Milwaukee	436,763	743,834
Foote-Burt Co., Cleveland	138,409*	94,380
American Can Co., New York	13,645,498	17,927,833
Iron Fireman Mfg. Co., Portland, Oreg.	606,901	711,460
Murray-Ohio Mfg. Co., Cleveland	104,293	228,254
Cutler-Hammer Inc., Milwaukee	307,437	1,274,469
Eastern Malleable Iron Co., Naugatuck, Conn.	319,023*	36,177
Youngstown Steel Door Co., Youngstown, O.	49,535	2,209,500
Hydraulic Press Brick Co., St. Louis	307,175*	193,255*
Continental Can Co. Inc., New York	7,101,973	8,913,525
Reynolds Spring Co., Jackson, Mich	435,273*	219,115
McCord Radiator & Mfg. Co., Detroit	316,777*	20,845*
Yellow Truck & Coach Mfg. Co., Pontiac, Mich.	514,983	3,571,669
Van Norman Machine Tool Co., Springfield, Mass.	303,297	345,019
Western Electric Co. Inc., New York	5,734,033	19,514,197
Lima Locomotive Works Inc., Lima, O.	687,035*	1,019,982
Chamberlain Metal Weather Strip Co., Detroit	25,537	139,248
Universal Products Co., Dearborn, Mich.	202,711	461,218
Simonds Saw & Steel Co., Fitchburg, Mass.	357,003	1,738,528
General Steel Castings Corp., Eddystone, Pa.	1,808,693*	490,752
Bullard Co., Bridgeport, Conn.	22,171*	879,118
Bellanca Aircraft Corp., New Castle, Del.	172,645	120,265
Great Lakes Engineering Works, River Rouge, Mich.	126,444	406,962
Barium Stainless Steel Corp., Canton, O.	239,836*	195,335*
American Concrete & Steel Pipe Co., Southgate, Calif.	30,468	275,206
Chicago Railway Equipment Co., Chicago	61,758*	681,342
Electric Controller & Mfg. Co., Cleveland	85,749	812,919
Remington Arms Co. Inc., Bridgeport, Conn.	685,686	1,509,804
Youngstown Steel Car Corp., Youngstown, O.	18,435*	45,996*
Monarch Machine Tool Co., Sidney, O.	321,398	436,524
Geometric Stamping Co., Cleveland	68,096*	18,650
International Harvester Co., Chicago	18,472,000	32,493,000
Chapman Valve Mfg. Co., Indian Orchard, Mass.	571,390	770,449
Link-Belt Co., Chicago	1,106,041	3,232,373
Lamson & Sessions Co., Cleveland	377,674*	638,402
Thatcher Mfg. Co., Elmira, N. Y.	727,584	1,084,844
U. S. Hoffman Machinery Corp., New York	272,271*	489,104
Eureka Vacuum Cleaner Co., Detroit	290,462*	20,326
Hoskins Mfg. Co., Detroit	300,005	635,064
Wellman Engineering Co., Cleveland	38,958	97,108
Blaw-Knox Co., Pittsburgh	145,601	2,379,692

DIVIDENDS DECLARED

Midland Steel Products Co., Cleveland, declared dividends of $2 per share on the 8 per cent cumulative first preferred stock, 50 cents per share on the noncumulative dividend shares, and 50 cents per share on the common stock, all payable April 1 to shareholders of record March 3.

♦

Wheeling Steel Corp., Wheeling, W. Va., declared a dividend of 50 cents on the $5 cumulative prior preference stock; this is payable April 1 to record of March 16. A similar amount was paid in January.

♦

Keystone Steel & Wire Co., Peoria, Ill., declared a dividend of 20 cents on common stock, payable April 15 to record of March 27. A dividend of 10 cents was paid on Feb. 1.

♦

Continental Steel Corp., Kokomo, Ind., declared the regular quarterly dividend of $1.75 a share on preferred stock, and 25 cents a share on common stock, both payable April 1 to record of March 15.

♦

Midvale Co., Philadelphia, declared a dividend of 75 cents a share on capital stock, payable April 1 to record of March 25. Last year the company paid dividends of 75 cents a share in April and July; $1 in October and $2.50 in December.

♦

National Steel Car Corp., Hamilton, Ont., declared the regular quarterly dividend of 50 cents on common stock, payable April 15 to record of March 31.

LABOR

FACTORY WORKERS RECEIVE CHARLES A. COFFIN AWARDS

■ GENERAL ELECTRIC CO. last week ranked factory workers with technicians of the engineering laboratories in selecting 18 "Phi Beta Kappas" of industrial progress for 1938.

Four workmen and three factory foremen, whose inventive minds found ways to improve the products they worked on and to save thousands of dollars in manufacturing costs, were among those accorded the company's highest honor, a Charles A. Coffin award, named in honor of its founder.

A millwright, whose 127 suggestions resulted in 78 improvements in manufacturing methods in the refrigerator department, was placed on honor roll with an engineer who developed a revolutionary process of annealing malleable iron.

The accomplishments of the 18 were outstanding among those of 60,000 workers. Each award consists of a framed certificate and a cash honorarium.

"NOT FROM THE BOSS, BUT ABOUT HIS BUSINESS"

Blaw-Knox Co., Pittsburgh, has issued to employes "a report, not from the boss, but about his business." Over the signature of President William P. Witherow, the pamphlet points out the "boss" is the 9077 stockholders.

The simplified and illustrated report tells employes that stockholders invested $7237 to create each job with the company. It shows that while company profits declined 94 per cent in 1938 (see p. 18), average employe wages declined only 6 per cent and total payrolls only 22 per cent.

Direct corporate taxes were approximately 2½ times the company's profits. Taxes amounted to 3.3 per cent of receipts, and totaled $132.32 per employe while profits were only $53.39 per employe.

BAR MILL WAGES STEADY

Wage rates in bar mills represented in Western Bar Iron association, having contracts with the Amalgamated Association of Iron, Steel and Tin Workers, will remain unchanged in March. They have been in effect since June, 1938. Rates are based on sales price averages in the preceding month.

ASK CIO FOR WAGE CUT

Reduction of 15 per cent in all wages has been asked of the Congress of Industrial Organizations by Pittsburgh Steel Foundry Corp., Glassport, Pa. To become effective March 1, the cut would be restored as soon as operations showed a profit for three consecutive months. The company employes hold a contract as an affiliate of the CIO.

"Comfortractor" Includes Radio, Ash Tray, Clock

■ **Closed car comfort for all farm work regardless of weather conditions is afforded by Minneapolis-Moline Power Implement Co.'s new "Comfortractor." Its roomy enclosed cab is lined with sound-absorbing material, has upholstered seats. Equipment includes radio, cigar lighter, ash tray, electric horn, sun visor, windshield wiper, clock, bumpers, powerful electric lights, self starter and low-pressure balloon tires. Speed ranges from a crawl to 40 miles an hour**

Invite Steelmen To TNEC Hearing

WASHINGTON

■ LEADING steel companies are being invited by the federal trade commission to have representatives at a hearing on the steel industry to be held the week of Feb. 27 before the temporary national economic committee.

The invitations are not subpoenas. Late last week the commission officials were still undecided whether they would subpoena any steel industry witnesses, or whether the situation would be depicted entirely by trade commission economists.

Following a general statement which will be presented to the TNEC by the FTC beginning on Feb. 28, it is anticipated the steel industry will be formally discussed. Commission officials believe this will come the latter part of the week.

"No Delay" in Steel Wage Date

■ EFFECTIVE date for minimum steel wages under the Walsh-Healey act will be March 1, it was believed in Washington last Friday. A postponement had been requested until April 3 by R. B. Thomas, representing a group of eastern producers.

While the labor secretary had not yet issued a formal decision, a high official in the labor department told STEEL'S correspondent there would be no further postponement. He indicated the department's opinion was that the industry had been given "ample opportunity to adjust their affairs" to the new minimum wages.

The labor department's edict fixing minimum steel wages for government contract work—62½ cents an hour in northeastern states—originally was to become effective Jan. 31. A postponement until March 1 represented a compromise between the department and the eastern producers who had requested a two-month delay in the effective date.

The smaller eastern producers have contended the stipulated minimum rates would mean "severe hardship to all, and perhaps, disaster to many." Government business, says their spokesman, now constitutes about 10 per cent of the small companies' total. Effect of the higher rates, he added, would be to "force the work into the hands of the large dominant companies."

Radio Phones on 100 Bulk Carriers; Ore Season Set for 40,000,000 Tons

■ SHIP-TO-SHORE radio-telephone service will be inaugurated on 100 additional lake bulk carriers during the 1939 season, estimates H. E. Hageman, manager, Lorain County Radio Corp., Lorain, O.

Eighty-two carriers of United States registry already have such equipment. Approximately 50 Canadian vessels are similarly equipped under Canadian license. At the close of 1937, 58 United States carriers had ship-to-shore and ship-to-ship communication facilities; at the end of 1936, only 14 were so equipped.

During the 1937 and 1938 shipping seasons more than 36,000 calls were handled through the Lorain County Radio Corp.'s facilities. The bulk of these were commercial calls and the majority terminated in Cleveland, headquarters for most fleets. A number, however, were to more distant points, including Florida, Texas, and even Geneva, Switzerland. Calls are by radio to the shore station and then are relayed overland by telephone.

Three fleets are using the service for dispatching ships.

Although ship-to-shore telephone service is recognized as an important safety feature, relatively few were emergency calls. Lake vessels are so sturdily built that only occasionally does an equipment breakdown or other emergency cause necessitate its use.

Several years' experience, according to Mr. Hageman, has demonstrated the necessity and practicability of the system. If his expectations for equipping 100 more ships this season are realized, 60 per cent of the Great Lakes carriers will be so equipped.

Installations to date have been voluntary as there is no federal law specifying such equipment on freight carriers. Practically all the carriers also are equipped with direction finders and gyro compasses. The federal communications commission, under which the radio service is licensed, has under way a study of Great Lakes shipping conditions and is expected to report to

Shipments of Iron Ore from Lake Superior Mines

Mesabi Range

	1937	1938		1937	1938		1937	1938		1937	1938
Adams Spruce	1,988,118	848,648	Forest	384		Langdon-Harrison	5,114	1,842	Patrick-Ann	127,702	59,567
Agnew	304,577	174,920	Fraser	1,093,233	570,951	LaRue	305,539	137,944	Patrick Fines	50,361	
Ajax	2,246		Genoa-Sparta	29,831		Larkin	6,159		Quinn	9,435	
Albany	404,729	1,249	Godfrey-Burt	607,663	116,765	Leonidas	649,557	540,403	St. Paul-Day	151,910	
Alexandria	235,320	219,121	Godfrey-Glen		137,727	Lincoln	82,093		Sargent	225,821	99,840
Alice		33,252	Grant	1,378,248	176,156	Mace No. 2	1,518		Scranton	955,191	219,817
Alpena	425		Halobe	459,147	97,208	Magnetic Conc.	23,520	6,361	Sellers	6,084,400	687,636
Arcturus	945,736		Harold		83,341	Mahoning	5,166,410	1,515,572	Shada	89,460	
Argo (Mesabi Sinter)	3,679		Harrison	674	64,214	Malta	8,928		Shenango	386,653	31,311
Bennett	580,670	151,060	Harrison Fines		8,850	Mayas		9,252	Sliver	57,679	16,172
Biwabik	711,912		Hartley-Burt	175,742	258,649	Mesabi Chief	826,400	582,907	Smith	54,166	6,911
Bray		944	Hawkins	393,322	161,881	Minnewas	1,975,207	995,590	Snyder	100,390	40,105
Bruce	155,501	188,490	Hill Annex	2,469,654	585,783	Minorca	15,297		South Agnew	48,167	26,281
Burns	16,213	17,078	Hill Trumbull	808,125		Missabe Mt.	2,733,856	898,118	So. Uno N. P.	28,521	
Burt-Pool-Day	354,318	189,665	Hoadley	139,701		Monroe-Tener	69,794		Stevenson	35,765	
Canisteo	606,041	555,194	Hugh	379		Morris	2,248,830	187,115	Susquehanna	505,111	
Chataco	91,594	52,726	Hull Rust	4,178,452	1,294,509	Morrison	1,177,853	314,633	Virginia	167,598	
Commodore	2,751		Joann	2,258		Morrow		58,440	Wacootah	425,231	121,912
Corsica	437,756		Judd	16,182	55,017	N. Harrison	114,884		Webb	709,237	115,606
Dale	222,912	30,537	Julia-Norman	101,450	77,220	N. Harrison Ann.	218,031		York	82,507	
Danube	451,577	138,356	Kevin	47,709	207,045	Onondaga	4,750				
Dunwoody	86,499	1,508	Kinney	48,366		Pacific	99,491		Total	45,823,571	13,304,036
			Langdon	241,941	132,637						

Menominee

	1937	1938		1937	1938		1937	1938		1937	1938
Baltic	8,905	5,509	Davidson Group	191,629	19,376	Homer	181,030	57,212	Tobin	59,352	34,985
Bates	153,546	85,336	Fogarty	93,648	3,109	James	218,973	81,709	Virgil	172,498	36,021
Bengal	102,059	43,367	Forbes	289,296	54,940	Loretto	2,382		Warner	6,379	
Berkshire	52,784	10,086	Globe-Cornell	54,954	34,028	Matilda	2,020	1,716	Zimmerman	2,574	
Bradley	66,304	24,394	Hemlock		75	Penn Mines	310,727	179,275			
Buck	227,604	52,422	Hiawatha No. 1	282,413	191,897	Riverton	35,728		Total	2,649,062	980,135
Caspian	10,381		Hiawatha No. 2	105,896	64,678	Rogers	17,980				

Marquette

	1937	1938		1937	1938		1937	1938		1937	1938
Archibald	6,078		Champion	1,965		Lloyd	598,116	112,191	Richmond	209,428	84,606
Athens	476,039	98,508	Cliffs Shaft	515,840	163,021	Maas	778,757	138,557	Stephenson	35,806	19,466
Blueberry	442,101	67,039	Francis	36,366		Mary Charlotte	15,423		Tilden	305,418	85,589
Breitung-Hematite No. 1	5,354		Gardner-Mackinaw	152,616	14,488	Morris	385,375	239,867	Volunteer	415,352	92,136
Cambria-Jackson	311,157		Greenwood	37,658	29,556	Negaunee	792,506	331,176			
			L. Sup.-Holmes	217,037		Princeton	8,813	57	Total	5,747,812	1,476,257
						Republic	607				

Gogebic

	1937	1938		1937	1938		1937	1938		1937	1938
Anvil	113,661	77,380	Ironton	295,139		Penokee	111,662	96,552	West Davis	669,040	101,408
Cary	243,694	28,636	Keweenaw	180,762	165,446	Plymouth	740,691	217,975			
Davis	6,628		Montreal	1,174,185	596,166	Puritan	261,168	103,109	Total	5,661,270	2,277,706
Eureka-Asteroid	462,392	317,667	Newport	418,316	81,742	Sunday Lake	582,906	188,862			
Geneva	144,780	73,424	Palms	937	773	Wakefield	255,309	228,566			

Cuyuna

	1937	1938		1937	1938
Alstead-Hillcrest	241,998	42,400	Merritt	92,453	16,698
Armour No. 1	52,112	199,242	Portsmouth	134,536	17,393
Evergreen	121,554	24,328	Sagamore	408,847	54,715
Hopkins		5,120	South Hillcrest	86,064	
Louise	175,610	5,392	Wearne	90,884	63,529
Mahnomen	371,387	152,280			
Mangan No. 1		726	Total	1,775,445	581,823

Vermilion

	1937	1938		1937	1938
Chandler		17,589	Zenith	424,02d	225,867
Pioneer	597,318	422,912			
Sibley	236,984	127,837	Total	1,453,080	929,952
Soudan	194,752	135,747			
GRAND TOTAL				63,110,240	19,549,909

congress before the end of the year.

When the 1939 shipping season opens, two new stations, in addition to the one at Lorain, will be in operation by the Lorain company. One at Duluth was completed last November and was used for a few days before the 1938 season closed. Another will be inaugurated at Port Washingon, Wis.

Impetus to new installations is expected to result from an anticipated busier shipping season in 1939. Preseason estimates of the iron ore movement center at slightly above 40,000,000 tons. or more than twice that of 1938. Such a tonnage would necessitate calling into service more than two-thirds the total fleet.

Columbia Transportation Co., operator of Great Lakes bulk freighters, will convert the H. T. EWIG into a self-loader and unloader at an estimated cost of $150,000, work to be completed about April 15. Fast revolving 45-ton cranes will be placed on the vessel.

1938 MINE SHIPMENTS LESS THAN THIRD OF 1937 TONNAGE

Shipments of iron ore from Lake Superior mines to upper lake ports, and all-rail to destination, as compiled by the Lake Superior Iron Ore association, Cleveland, show a total of 19,549,909 gross tons for 1938, compared with 63,110,240 tons in 1937 and 45,203,672 tons in 1936.

All-rail shipments in 1938 totaled 286,023 tons. In 1937 the tonnage was 587,281 tons, and in 1936, 375,767 tons.

Iron ore beneficiated at the mines, through such processes as washing, jigging, magnetic separation, sintering and drying, in 1938 totaled 9,135,742 tons. compared with 24,960,418 tons in 1937.

MEETINGS

GEARMAKERS SCHEDULE MEETING IN VIRGINIA

■ AMERICAN Gear Manufacturers association will conduct its annual meeting at the Hotel Cavalier, Virginia Beach, Va., May 22-24, according to the announcement of J. C. McQuiston, manager-secretary, 602 Shields building, Wilkinsburg, Pa.

The program, nearing completion, lists the following papers: "Modern Drafting Room Practice," by George R. Martins, Falk Corp., Milwaukee; "Importance of Safety," E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati; "Surface Hardening of Gear Teeth," Dwight Van De Vate, Gleason Works, Rochester, N. Y.; "Turret Lathes in a Gear Shop," J. R. Longstreet, Warner & Swasey Co., Cleveland; "Gear Metallurgy," E. J. Wellauer, Falk Corp., Milwaukee; "Oil Well Pumping Units—Their Application and Use in the Field," R. G. De la Mater, Parkersburg Rig & Reel Co., Parkersburg, W. Va.; "Automotive Transmissions," Mr. Rothrock, General Motors Corp., Detroit; and "Bronze for Worm Gears," C. H. Bierbaum, Lumen Bearing Co., Buffalo.

SPEAKERS FOR ADVERTISING CONFERENCE ANNOUNCED

Two addresses will feature the regional conference for advertising and marketing men in Newark, N. J., March 15. C. S. Ching, director of industrial and public relations, United States Rubber Co., New York, will speak on "All Quiet on the Industrial Front"; and Merle Thorpe, editor and publisher, Washington, will address the dinner on "The Plight of Enterprise." The conference is sponsored by the Industrial Marketers of New Jersey.

FOREIGN TRADE EXPANSION IS GOAL OF EXPORT CLUB

Export Managers Club of New York will conduct its annual get together at Hotel Pennsylvania, New York, March 14. The meeting, to deal with all phases of the export trade, schedules sessions morning and afternoon, four group luncheons at noon, and a banquet in the evening. One of the group luncheons is arranged for automotive, machinery and hardware interests. O. O. Gallup, 20 Lafayette street, New York, is secretary.

January Exports Off 19 Per Cent

■ EXPORTS of steel and iron products in January, excluding scrap, totaled 134,788 gross tons, approximately 19 per cent less than the 166,404 tons in December. In January, 1938, the tonnage was 229,757.

Principal declines were 14,297 tons in pig iron and 10,175 tons in nonalloy, nonfabricated steel plates. Exports of nonalloy ingots, tin plate and nonalloy steel sheets were larger than in December.

Exports were valued at $10,214,547 in January, compared with $11,506,216 in December, and $14,958,542 in January last year.

Scrap exports also were lower at 227,884 tons, valued at $3,351,351, compared with 323,691 tons, valued at $4,797,676 in December, and 356,537 tons valued at $6,065,852 in January, 1938.

■ All labor unions in Ohio would be required to incorporate under a bill introduced in the legislature last week by Rep. Rodger Farnsworth, Toledo.

Activities of Steel Users, Makers

■ SOUTH CAROLINA public service authority has awarded contracts totaling nearly $2,000,000 to General Electric Co. and Newport News Shipbuilding & Dry Dock Co. for equipment for the Santee-Cooper power house at Pinopolis. The General Electric contract, for generators, totals $1,222,545, and the Newport News contract, $746,525.

♦

Allis-Chalmers Mfg. Co., Milwaukee, last week received two orders aggregating $850,000. A 25,000-kilowatt steam turbine and generating unit was ordered by Central Illinois Service Co., Springfield, Ill., for its power station at Hutsonville, Ill. Otter Tail Power Co., Fergus Falls, Minn., specified a 10,000-kilowatt steam turbine generating unit for its Kidder station at Wahpeton, N. D.

♦

John J. Nesbitt Inc., Holmesburg, Philadelphia, has built a brick and concrete addition containing 15,000 square feet, for manufacture of a special extended copper heat-transfer surface recently developed.

♦

Stockholders of the Stewart Motor Corp., Buffalo, have approved immediate liquidation of its truck manufacturing division. Parts and service department will continue to be operated.

♦

Citizens' Gas & Coke Utility of Indianapolis has appointed Hickman, Williams & Co. exclusive agent for sales of by-product foundry and domestic coke.

♦

American Flexible Coupling Co., Erie, Pa., has appointed Industrial Sales & Engineering Co., 3118 North Broad street, Philadelphia, district sales representative in southeastern Pennsylvania, New Jersey and eastern Maryland.

♦

American Car & Foundry Co., New York, has purchased from Shippers Car Line Corp., New York, 14,000 shares of common stock of the American Welding Co., Chicago. This represents all of the company's issued and outstanding stock.

♦

Revisions in territorial representation for turbine pumps built by Roots-Connersville Blower Corp., Connersville, Ind., have been announced by J. B. Trotman, manager, turbine pump division, as follows: R. L. Deppmann Co., 957 Holden avenue, Detroit, is now promoting sales of turbine pumps in eastern

(*Please turn to Page* 106)

MEN OF INDUSTRY

■ J. T. WHITING, vice president, Alan Wood Steel Co., Conshohocken, Pa., has been elected president. He succeeds Clement B. Wood, who has resigned as president but continues as chairman of the board. C. E. Davis, heretofore assistant to the vice president, becomes vice president.

Following graduation from the University of Michigan in June, 1909, Mr. Whiting joined the metallurgical department of Illinois Steel Co.'s South works, South Chicago, Ill., going from there to the blast furnace department. He worked successively for the By-Product Coke Corp., South Chicago, then under the management of Semet-Solvay Co.; Federal Furnace Co., South Chicago; Whitaker-Glessner Co., Portsmouth, O.; Steel & Tube Co. of America, Mayville, Wis., and Donner Steel Co., Buffalo. In September, 1927, he joined Hamilton Coke & Iron Co., Hamilton, O., as vice president and general manager. He was elected vice president of Alan Wood Jan. 1, 1932.

♦

Charles M. Schwab, chairman, Bethlehem Steel Corp., sailed recently for a trip to the Mediterranean.

♦

John A. Coakley, president, Automatic Sprinkler Corp., Youngstown, O., has been elected a director, Wellman Engineering Co., Cleveland.

♦

Lewis A. Dibble has been re-elected president, Eastern Malleable Iron Co., Naugatuck, Conn. All other officers have also been re-elected.

♦

R. C. Artner, formerly assistant treasurer, Midland Steel Products Co., Cleveland, has been elected treasurer, to succeed the late R. M. Fisher.

♦

Harry H. Field has relinquished his duties as secretary, Lindsay Wire Weaving Co., Cleveland, but will continue as treasurer and a director.

♦

George A. Brandel, the past 15 years identified with roofing and sheet metal building products in sales and executive capacities, has been appointed manager of jobber sales, Berger Mfg. division, Republic Steel Corp., Canton, O.

♦

Armen H. Tashjian has been appointed consulting engineer in charge of Foundation Engineering with the Union Metal Mfg. Co., Canton, O., specializing in steel piling for foundations. He will have his office at 2341 Carnegie avenue, Cleveland.

J. T. Whiting

♦

Kent Harrison, open-hearth consultant, American Rolling Mill Co., Middletown, O., has been appointed assistant to general superintendent at the company's Butler, Pa., plant.

♦

C. E. Kendall, formerly manager of merchant wire product sales for Pittsburgh Steel Co., Pittsburgh, has become associated with the wire sales department of Jones & Laughlin Steel Corp., Pittsburgh.

♦

Robert K. Kulp, formerly research metallurgist, Lukens Steel Co., Coatesville, Pa., is now associated with Timken Roller Bearing Co., Canton, O., as research metallurgist, steel and tube division.

♦

C. W. Lugar, until recently associated with Minneapolis-Honeywell Regulator Co., has joined the Wheelco Instruments Co., Chicago. He has been assigned to the Indianapolis territory, with headquarters at 216 Indianapolis Terminal warehouse.

George A. Brandel

♦

Edwin L. Dennis, well known combustion engineer, and for 12 years chief engineer and consultant for Godchaux Sugars Inc., New Orleans, has joined Coppus Engineering Corp., Worcester, Mass., as chief combustion engineer.

♦

William A. Marshall, formerly superintendent of construction at the Irvin works, Carnegie-Illinois Steel Corp., has been made superintendent of maintenance. Warren W. Scherer has been named assistant superintendent of maintenance, and Arthur M. Krieger, assistant to superintendent of maintenance.

♦

Francis Juraschek has become associated with Carnegie-Illinois Steel Corp., Pittsburgh, as manager of market research. He formerly was consulting editor of *Iron Age*. Mr. Juraschek's business career includes experience as market counsellor, advertising manager and sales promotion manager for several companies.

♦

O. A. Lenna has been elected president and general manager, Jamestown Metal Equipment Co. Inc., Jamestown, N. Y. Gustaf A. Lawson and Harry L. Briggs have been made vice presidents; Harry A. Lenna, secretary and treasurer, and Ross W. Alden, assistant secretary and assistant treasurer.

♦

Milo T. Siverling has been elected vice president and a director, Buffalo Foundry & Machine Co., Buffalo, with headquarters at present in Minneapolis, where he will act as president of Buflovak-Northwest Co., an affiliate. Guy N. Harcourt has been elected vice president in charge of engineering at Buffalo.

♦

G. J. Hawkey, president, Cleveland Duplex Machinery Co. Inc., has been elected chairman, Cleveland chapter, American Society of Tool Engineers. Other newly elected officers include: Vice chairman, R. H. Behrend, assistant chief tool designer, National Acme Co.; secretary, C. V. Briner, Pratt & Whitney Co.; treasurer, C. W. Scheihing, chief inspector, National Carbon Co. Inc., Edgewater works.

♦

Wilder Gutterson and Lewis Roberts have organized Engineering Products Service Inc., 420 Lexington avenue, New York, to offer engineering service to manufacturers in the field for new products and also to act as counsel on marketing problems. Mr. Gutterson was formerly associated with American Chain Co., Bridgeport, Conn., as

sales manager, and with Ryerson & Haynes Inc., Jackson, Mich. Mr. Roberts was previously with H. A. Wilson Co., Newark, N. J.

♦

William C. Arthur has been elected president, Talon Inc., Meadville, Pa., succeeding the late Wallace D. Walker. Mr. Arthur had been vice president and a director since 1937. S. M. Kinney, heretofore sales manager, has been made vice president, and P. K. Poulton, formerly treasurer, becomes secretary-treasurer.

♦

H. G. Daley, heretofore vice president in charge of sales, Sweet's Steel Co., Williamsport, Pa., has been elected president. He succeeds Herbert P. Ladds, who has resigned to become president, National Screw & Mfg. Co., Cleveland.

William F. Spilka, formerly assistant to the president, has been named executive vice president.

K. E. Crooks has been re-elected

H. G. Daley

vice president; H. R. Boston, secretary-treasurer; C. E. Lynch, assistant secretary and assistant treasurer, and J. E. Cupp, general counsel.

♦

William H. Winterrowd has been elected vice president in charge of operations, Baldwin Locomotive Works, Eddystone, Pa. He was graduated from Purdue university as a mechanical engineer in 1907. In 1923 he joined Lima Locomotive Works as assistant to the president and in 1927 became vice president. Since 1934 he has been vice president, Franklin Railway Supply Co.

♦

Fred Grotts has been elected president and a director, Fort Pitt Steel Casting Co., McKeesport, Pa., succeeding the late C. S. Koch. Mr. Grotts formerly was vice president and works manager, Chicago Steel Foundry Co., Chicago. Mr. Grotts received his education at the University of Illinois, and the school of

Fred Grotts

mines and metallurgy, University of Missouri, following which he became chief metallurgist and chemical engineer for Curtis Aeroplane & Motor Corp., Buffalo, where he had technical control over metallurgical processes during the World war. He was cited by the United States, England and France for outstanding results of research and development in materials. Mr. Grotts is a member, American Society for Testing Materials, American Institute of Mining and Metallurgical Engineers, and American Foundrymen's association.

♦

Leonard Larson has been named chief engineer, Cleveland district, Republic Steel Corp. He has been associated with Republic and its predecessors 22 years. He was appointed chief engineer of the Central Alloy Steel Co. at Canton ten years ago.

R. H. Bahney succeeds Mr. Larson as chief engineer of the Central Alloy district. He became assistant superintendent of mechanical and electrical departments at Canton in 1931 and was transferred to the engineering department as electrical engineer in 1936.

DIED:

■ JAMES H. GRAY, in Berkeley, Calif., Jan. 13. Starting as metallurgist for Illinois Steel Co., he became assistant to the late W. R. Walker at New York when the latter was made vice president of the United States Steel Corp. at the time of its organization. He was active in investigating new processes, and was sent to Europe to report on the electric furnace patented in France by Dr. Paul Heroult. The latter accompanied him to the United States and is credited with having set up the first electric furnace in this country. Mr. Gray became a leading figure in the electric steel branch of the industry, in charge of the Heroult furnace department of the Steel corporation.

In 1924 he resigned as chairman of the openhearth steel committee of the Steel corporation and other connections and moved to Nice, France. He married the widow of Dr. Heroult and a few years ago returned to the United States to permit his son to finish his education here. He is survived by his widow, a son and a sister, all of Berkeley, Calif.

♦

Joseph C. Belden, 63, chairman and president, Belden Mfg. Co., Chicago, Feb. 17, in Chicago. He founded the company in 1902.

♦

Harrison J. L. Frank, 58, president, Bull Dog Electric Products Co., Detroit, in Miami Beach, Fla., Feb. 14.

♦

William D. Smith, 79, retired industrialist, who in 1891 founded the Ohio Machine Tool Co., Kenton, O., in that city, Feb. 17.

♦

D. A. Birdseye, 56, associated with Lamson & Sessions Co., Cleveland, 37 years as salesman and district sales manager in the Chicago territory, Feb. 14.

♦

Charles R. Crane, 80, former president, Crane Co., Chicago, at his winter home in Palm Springs, Calif., Feb. 14. He became vice president in 1894 and president in 1912, resigning two years later.

♦

Wylie Haskell Vilas, 73, in Cleveland, Feb. 7. Following service with the United States Steel Corp. he was a commissioner for the American Iron and Steel institute until his retirement in 1911.

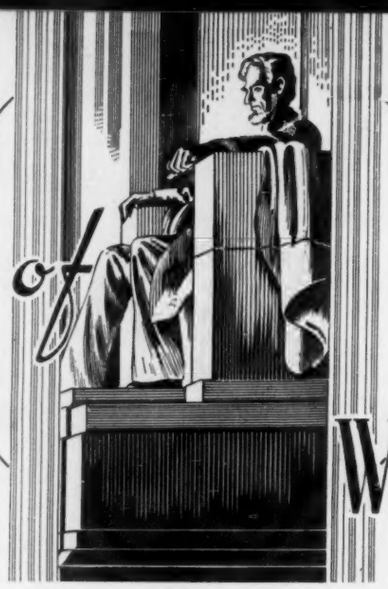
♦

George A. Terry, 80, over 40 years chief of the legal and patent division, Westinghouse Electric & Mfg. Co. and affiliated companies, in New York, Feb. 18. He was associated with George Westinghouse in the early days of the company. He became vice president in 1907, retiring in 1930. In 1931 he was elected honorary vice president.

♦

A. M. Clark, 67, president, Columbia Steel Casting Co., Portland, Oreg., in San Francisco, Feb. 10. He was born in Aurora, Ill., and at an early age joined the Chicago, Burlington & Quincy railway, and later the Sargeant Co. as apprentice. He then went to Portland for the Columbia Engineering Works which later became Columbia Steel Co., a subsidiary of United States Steel Corp. In 1931 the corporation sold the foundry at Portland to Mr. Clark and he devoted his efforts to that enterprise.

Windows of WASHINGTON



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ BUSINESSMEN and industrialists are watching Harry L. Hopkins, new secretary of commerce, with intense interest. Many believe that he will adopt a favorable attitude and possibly persuade the President to do likewise.

Secretary Hopkins already has had one long session with the department's business advisory council, composed of some half hundred leading business men and industrialists of all political faiths.

Good strategy has been shown by the new secretary in dealing with members, both as a unit and individually. He has asked several to do special jobs for him, to make surveys dealing with the work of his department. This is a new procedure for a secretary of commerce; "Uncle" Dan Roper never conceived using these men for this purpose.

Believe Hopkins Sincere

Another meeting of the advisory council has been called for early March. Those who attended the last conference seem to have been considerably impressed with Mr. Hopkins' sincerity to deal with business in a co-operative way, and, while some of them still have their fingers crossed, they certainly showed more interest in what Mr. Hopkins is trying to accomplish than any time during the Roper regime.

Mr. Hopkins undoubtedly is the President's No. 1 trouble shooter, as was evidenced recently when he at least helped largely in straightening things out for the TVA.

The new secretary apparently has changed his way of thinking materially in going from WPA work to the President's cabinet. However, up to this time, Mr. Hopkins has not expressed himself freely to the press, and has had only three press conferences in more than two months. At the conferences thus far held he has merely fenced with correspondents and kept any plans which he may have for the future of the department secret. That at least was his attitude up to last Friday night's broadcast. Whether he will change his attitude now remains to be seen.

Many shrewd political observers, who know Mr. Hopkins well, believe he sees the handwriting on the wall; that he realizes the days of radical legislation are over, at least for the time being. They believe Mr. Hopkins himself is likely to turn to the right and possibly to persuade the President to do the same in his attitude toward business. There is a chance the statement made by President Roosevelt last week that business has nothing to fear from the government and that taxes will not be raised for business may have been brought about, partially at least, by the attitude to Secretary Hopkins.

One thing is certain and that is that Mr. Hopkins has the ear of the President, something Dan Roper never had; if Hopkins favors business, he may be able to "sell" the President.

General belief in Washington is that the President is trying to build up Hopkins as leading New Deal candidate for the Presidency in 1940. This seems to be substantiated by the fact Mr. Hopkins is enlarging his press relations division and there is an indication members of this division will devote some time to building up Hopkins rather than the department.

Early Policy Smart

Those who have watched the matter closely express the opinion Hopkins was smart when he first went to the commerce department because he said nothing and looked into matters carefully. The assumption was that after he had sufficient time he would decide on his program and than make quick changes in personnel.

Up to the time this is written, these changes have not been made and there is some indication matters at the department are not clicking as well as hoped. This is partly due to the fact, it is believed, that Mr. Hopkins has not taken any of his assistants into his confidence. Assistant secretaries, division heads, and other department experts have been at a loss to know just what his policy will be.

SEES WAGE GUARANTEES FOR SEASONAL WORKERS

The fair labor standards act, according to Elmer F. Andrews, administrator, will result in a wider use of a guaranteed annual wage contract by seasonal industries. Such a contract, of course, is one under which employes are paid on an annual or semiannual basis, and under this act such employes cannot be required to work more than 1000 hours in six months or more than 2000 hours in a year.

Mr. Andrews based his prediction on a formal memorandum prepared by Calvert Magruder, general counsel for the wage-hour division, interpreting two sections of the law. The memorandum was intended to serve, Mr. Magruder said, as a guide to the administrator unless the courts direct otherwise.

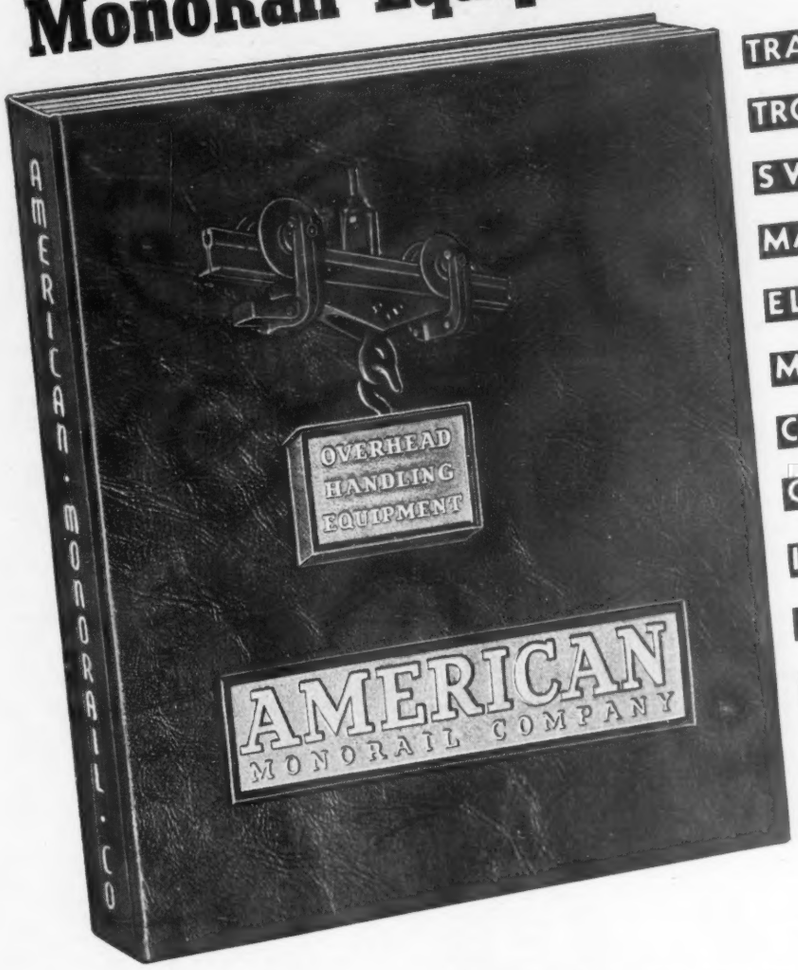
Mr. Andrews indicated the guaranteed annual wage basis would become attractive to employers by giving them the right to step up production in emergencies without paying employes overtime.

He emphasized the exemption from overtime payment, however, applied only to industries whose employes worked under union contracts calling for specific wages and working periods over long terms.

John C. Gall, counsel for the National Association of Manufacturers, said last week most difficulties now faced in the administration of the law are due to several inconsistent objectives being pursued.

Mr. Gall said that if administrative interpretations on the act are sustained by the courts, important congressional changes in the act

A new catalog of MonoRail Equipment



- TRACK
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This 254 page book serves as a reference for complete technical data covering every phase of overhead handling. Copy will be sent upon request on company letterhead.

Many new designs and improved devices for handling steel of all kinds are shown in this new book.

TWO COMPLETE LINES FOR MANUAL OR POWER OPERATION

This new catalog presents up-to-date information covering two complete lines of MonoRail equipment for load capacities up to 5 tons. It contains hundreds of installation pictures showing how easily American MonoRail systems solve difficult handling problems. More than forty pages are devoted exclusively to technical data ... Full showing of power operated equipment indicates the progress made in automatic operation of carriers and cranes ... Anyone interested in securing the latest information about the money saving possibilities of overhead handling can obtain a copy of this book by letterhead request.

The American MonoRail Co

13102 Athens Ave., Cleveland, Ohio

will be needed. He made a number of suggestions for amendments to the law.

N.A.M. RELEASES STUDY ON DEPRESSION PREVENTION

Goods and services can most economically and beneficially be provided by private enterprise, emphasizes the National Association of Manufacturers in the second phase of its depression study — conditions necessary for sustained prosperity once recovery is attained.

First phase (STEEL, Feb. 20, p. 26) outlined depression causes and governmental, business and labor policies which must be avoided if recovery is to go forward.

Howard Coonley, N. A. M. president, comments on the second phase of the report: "Sustained prosperity for the United States can only be obtained by a general agreement of all groups upon the conditions which must prevail if such prosperity is to be maintained."

Discussing business - government relationship, the study lists seven major points: The absence of governmental activity which prevents effective functioning of private enterprise; support of policies which promote such efficient functioning; acceptance by business of regulation for the common good; recognition by government that regulation does not mean too stringent control; moderate and equitable taxes; restriction of the public debt, and of expenditures.

Conditions of competition, prices and wages considered essential: Individual income keeping pace with per capita production; full utilization of technological improvements; balance in prices of agricultural, industrial commodities, services and labor to encourage buying and selling and provide steady employment for those willing and able to work; avoidance of unnecessary and uneconomic rigidities in prices and wages; no private or public uneconomic restriction on production; fair competition.

Should Count All Expense

It must also be recognized private business cannot compete on equal terms with government subsidized industry, that such competition discourages private industry, diminishes employment and tends to prevent sustained prosperity.

The study urges "where government engages in business activity, all aspects of value should be fully considered at all times, with all elements of total cost properly calculated and allocated, including capital charges, taxes, and other costs which private industry would have had to pay, and with such costs publicly reported."

Reasonable availability of adequate credit for legitimate financing, absence of stock market gambling and manipulation, a definite and dependable currency standard are some of the credit and banking conditions necessary. Also essential are credit operations which avoid abnormal and violent increases or decreases in the total volume of money and credit; a private banking system, publicly supervised; interest rates which express the balance between savings and the demand for capital; avoidance of excessive private debt.

Generally harmonious labor relations are one employment condition needed, the study continues. Another is a balance between industrial, commercial and agricultural payrolls, employment and physical output, as indicated by the long-term trend of relationship of payrolls to employment and of employment to physical output. Employers should adopt all feasible methods for stabilizing employment.

On capital formation, the report lists as necessary: "Conditions which permit and incentives which are sufficient to insure the economically adequate and continued saving of capital and its use for investment in productive enterprises."

WAR DEPARTMENT SEEKS TO SPEED PLANE PRODUCTION

War department officials are becoming more and more interested in the aviation situation and are trying to make plans to produce 1000 planes a month and in this connection are drafting legislation to prepare the aviation industry for mass production in case of war.

It has been stated by reliable war department experts that the 5500 planes which are called for in the new armament program would be wiped out during the first three months of any war in which the United States might be involved, and when these were destroyed probably the determining factor in any war would be the speed with which the airplanes could be replaced.

It is anticipated by the war department that within the next two years about 4000 planes will be built for the army, either new or replacements, and under the present procurement law only three or four companies would obtain the bulk of the construction. In order to permit the war department to spread this program to cover the major plants, it will be necessary to suspend the present competitive bidding provision.

If this plan is carried out, and the war department officials hope it will be, it will mean all aviation plants will be furnished with jigs, dies, and machine tools for building the latest type combat planes, and also would train personnel.

The war department is much concerned also over the lack of aviation craftsmen available to the United States at this time, said to be only 27,000. Reliable reports which have reached the United States indicate that Germany has some 200,000 aviation workers engaged in their aircraft building program, while England and France each have half that number.

War department experts expect to have their proposed legislation drafted soon and the military affairs committee of the house has promised it immediate attention.

Assistant Secretary Louis Johnson announced award of a $4,857,582 contract to Wright Aeronautical Corp., Patterson, N. J., for R1820 engines.

GOVERNMENT IRON, STEEL AWARDS TOTAL $368,188

During the week ended Feb. 18, the government purchased $368,187.62 worth of iron, steel and their products under the Walsh-Healey act: Columbia Steel Co., San Francisco, $10,800.12; The Colorado Fuel & Iron Corp., Denver, $50,349.56; Graybar Electric Co. Inc., New York, $28,948.56; Wheeling Corrugating Co., Detroit, $11,572.93; American Car & Foundry Co., New York, $19,072.90; Truscon Steel Co., Chicago, $11,341; Bethlehem Steel Co., San Francisco, $119,780.80; Columbia Steel Co., San Francisco, $23,592; Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., $18,619.76; Smith Corp., Portland, Oreg., $17,834; Koppers Co., Bartlett Hayward Division, Baltimore, $19,800; Nicholson File Co., Providence, R. I., $13,850.37; Graybar Electric Co., Denver, $11,106.06; and The P. & M. Co., Chicago, $11,474.70.

SENATE COMMITTEE REPORTS FAVORABLY ON THOMAS' BILL

Senate military affairs committee has reported favorably on Senator Thomas' bill for acquiring stockpiles of strategic materials and metals. The Utah senator's bill is similar to several pending in the lower house. It provides $25,000,000 annually for four years to build up stockpiles of strategic materials and metals and also provides $500,000 a year for four years for the bureau of mines and the geological survey for experiments and explorations.

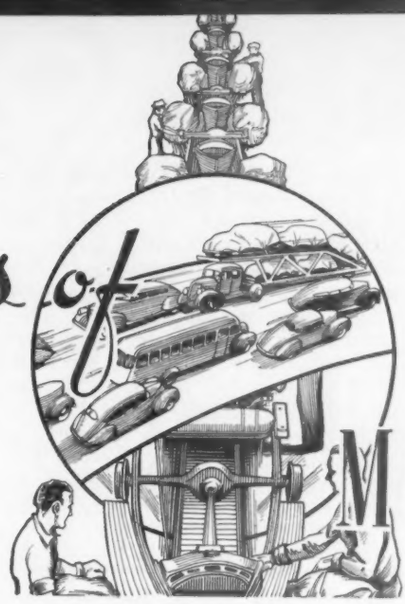
OFFERS BILL TO CORRECT FREIGHT RATE INEQUALITIES

Senator Connally, Texas, has introduced a bill in the senate "seeking to correct the inequalities and discriminations in freight rates in Texas and the southwestern territory."

Senator Connally said:

"The act seeks to remove the differentials which operate to increase the rates in that territory."

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ MATERIALS and parts suppliers to the automobile industry are studying possibilities for an upward movement of releases shortly to meet the demands of accelerated spring production schedules; but as yet there is little indication of such an eventuality. Business in this category is in a quiet period and the usual amount of concern is being expressed over the current lassitude. However, a speeding up of auto assembly lines should develop in the next 30 to 60 days; what this may mean in the way of materials, such as steel, is not yet clear.

Ford was supposed to be releasing a steel tonnage this week for April production, covering an estimated 70,000 cars, but this business did not develop, and steel offices here are now of the opinion no substantial buy will be made for April output. Apparently the stock or float of steel ordered last fall, plus the near-capacity output of Ford open-hearth furnaces, has been adjudged sufficient. It is believed likely some purchasing will be done for May assembly schedules, although here again a tendency is observed to discount the likelihood of much outside buying of steel.

One district manager for a steel company has stated he does not expect Ford will place much over 20,000 tons before the beginning of June.

Just how extensively steel users covered their first quarter needs last fall when the "low-price" steel was being offered is now coming to light. Inventories were built up more than generally supposed, and a number of large users are covered through March. As a consequence, buying thus far this year has been of a fill-in variety, and it will probably be some time late in March or early April before further large scale commitments can be anticipated.

Seasonal easiness in new car sales is not helping the situation. Production has been scaled down 10 to 15 per cent, but still is probably running ahead of retail sales, indicating dealers are stocking some cars. This is normal at this time of year, and up to now stocks in the hands of dealers have been anything but excessive.

■ FORD appears to be swinging into the tractor and agricultural implement business in more certain fashion, a development which has been anticipated for a year or two. Engineers are now at work on a reported new version of the Ford tractor, as well as a complete line of agricultural implements. It is said some interesting findings have been made concerning tractor design and operation, indicating possibly weight and mass are not as important in a tractor as are the means by which implements and tools are attached to the unit. This would mean perhaps that efficient operation can be built into a lightweight, low-power unit, with consequent reduction in overall cost.

Shortly a well-known Ford engineer, an expert in the design of power takeoff devices, and very close to Mr. Ford personally, will join the staff of a local equipment interest which has been the exclusive source of power mowing machines for the Fordson tractor. The latter unit is, of course, practically a dodo as far as domestic sales are concerned, but they still are being built in England and a few are shipped to New York each year for distribution in this country. The above-mentioned equipment interest is em-

✦

"Utility Sedan" Equipped with Wire Screen

■ **Entirely new body type for Plymouth is this "utility sedan," conversion of a regular two-door sedan for light delivery use. Sliding gate in the wire mesh screen just behind the front seat permits locking merchandise in the rear section. Because of the resemblance to conventional passenger equipment, the car is claimed to be free to travel on many boulevards where even light trucks are prohibited**

barking on a new program of implement construction, and the association of an experienced Ford engineer with the company marks a definite tieup with the Ford tractor and implement program.

This company, incidentally, is manufacturing a new mowing machine for the J. I. Case Co. which will be introduced shortly at a San Francisco equipment show. The mower is distinguished by its use of low-alloy high-strength steel, permitting effective reduction in dead weight with no sacrifice in the unit's strength.

It will be recalled about a year ago Mr. Ford was giving out interviews to newspaper correspondents concerning his proposed move into the agricultural implement business, in line with his "back-to-the-soil" philosophy. Pictures were reproduced of the new Ford tractor which he was running through tests on his Georgia property, and the story was prevalent around Detroit about the imminence of a new tractor program at the Rouge plant.

But the program never developed, and company sources disclaimed all knowledge of any such project. Later, these sources admitted a small-car program had been at least started, but the tractor project was confined to Mr. Ford's own mind.

Now, however, it seems likely developments are coming to a head, and definite announcement of Ford's plans in the tractor and implement field should be forthcoming before many months have passed.

■ CONFERENCES on 1940 models are being held regularly these days, and refinements are being placed on engineers' creations for the next model year. Buick is reported to have developed two new models for inclusion in its present line, giving this producer six series in all next year. One is said to be somewhat smaller than the 40 series, the smallest and least expensive in the present lineup. The other will be inserted somewhere among the larger models. All will embody fairly extensive front end and fender changes, with lamps incorporated in the front fenders.

Domestic retail deliveries of Buicks in the first ten days of February totaled 3917 units, compared with 2860 in the same period last year, a gain of 37 per cent. At the same time, used car stocks were reduced during the period, with sales totaling 8688, compared with 8133 in the corresponding period of February a year ago.

In the commercial field, a new type of delivery truck, dubbed the White Horse, has been unveiled by the White Motor Co., Cleveland. Of the type used by bakeries and milk dealers, the units are powered by engines mounted in the rear, being of the air cooled type, built by the Aircooled Motors Corp., Syracuse, N. Y. The latter company is operating in the old Franklin plant which has been rearranged and supplemented by a new assembly building. Initial production has been set at 25 engines per day on a White order for 4500 units.

The Syracuse company also is supplying 750 engines for an airplane manufacturer, and plans to carry stock-size Franklin engines to be offered as standard equipment with Davey compressors.

Rebirth of activity in this plant has given rise to reports of a new passenger car to be built there, but little credence is given such comment in this area.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	*315,000
March	519,022	238,598	.....
April	553,231	238,133	.....
May	540,377	210,183	.....
June	521,153	189,399	.....
July	456,909	150,444	.....
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Jan. 28	89,200	59,365
Feb. 4	79,410	51,443
Feb. 11	84,500	57,810
Feb. 18	79,860	59,100
Feb. 25	74,960	56,977

†Comparable week.

	Week Ended	
	Feb. 25	Feb. 18
General Motors	34,765	34,715
Chrysler	16,360	19,745
Ford	16,600	16,600
All others	7,235	8,800

■ RETAIL deliveries of new Pontiacs for January totaled 10,360, an increase of 64.3 per cent over the same month in 1938. New car inventories in the hands of dealers at the end of the month were 23,009, considered to be a normal number for the company's 3700 dealers.

Studebaker Corp. celebrated its 87th birthday on Feb. 16. Paul Hoffman, president, reviewed progress of the company since its inception in South Bend in 1852 with assets of $68 cash and two forges. Commenting on labor relations, Mr. Hoffman pointed out average length of employment of men now on the payroll is 11.06 years, the entire force representing 72,652 years of service. Studebaker produced its first "horseless carriage" in 1902 and began production of gasoline motor cars on a volume basis in 1904. The company now employs 6760, while its 2595 dealers employ 13,235 more. It is owned by 25,021 stockholders.

■ HOMER MARTIN, erstwhile president of the United Automobile Workers union, and still occupying that position in his own mind, appears to be waging a losing battle to regain control of the UAW. In a radio address last Tuesday, he bitterly denounced John L. Lewis and the CIO, but maintained reports of his affiliation with the AFL were untrue and premature. These reports were particularly disturbing to the four executive committee members of the union who still endorse Martin's policies, and last week the possibility of a break between Martin and his four remaining lieutenants became evident.

R. J. Thomas, now acting head of the UAW, claims support of 280,000 of the union's purported membership of 375,000, but both these figures are open to serious questioning. Pending the outcome of court battles and the two conventions scheduled by opposing factions next month, little can be discerned on the labor front except dissension.

First serious trouble between the opposing groups came last Wednesday at the Plymouth plant when the Thomas faction demanded exclusive recognition from the management. The company refused to take sides and a walkout was called, closing the plant.

The stoppage later was reflected at Briggs Mfg. Co., and at the Dodge plant. The next day when the Martin faction returned to work at Plymouth the Thomas adherents at Briggs refused to work and another tieup followed, affecting in all about 24,000 employes.

■ PACKARD is using a new type of interior finish on luggage compartments and built-in trunks. The compartments are given the usual coats of preservative and sound deadening materials and then the surface is sprayed with a coat of varnish-type adhesive. When this has become slightly tacky, flock, comprising rayon thread chopped up to the point where individual pieces are about 1/16-inch long, is blown into it with a special spray gun and high-pressure air.

The usual method has been to apply panels of jute, but it is understood to have been difficult to fix these panels firmly enough in place.

AVIATION

LOCKHEED PLACES $250,000 ORDER FOR PARTS WITH RYAN

■ RYAN Aeronautical Corp., San Diego, Calif., has been awarded a $250,000 contract for engine cowlings and firewalls by Lockheed Aircraft Corp., Burbank, Calif. This is the largest single order ever booked by Ryan.

The Lockheed company has registered with SEC its plan to issue 112,454 additional shares of $1 par common stock. Now outstanding are 660,879 shares. Proceeds will be used to increase capital, with allotments made for aircraft development and machinery purchases.

Recent navy department orders for aeronautical equipment: Eclipse Aviation division of Bendix Aviation Corp., East Orange, N. J., starter assemblies, $13,813; Wright Aeronautical Corp., Paterson, N. J., engine parts, $28,364; Pratt & Whitney division of United Aircraft Corp., East Hartford, Conn., engine parts and tools, $40,782; Pioneer Instrument Co. Inc., Brooklyn, N. Y., indicators, $14,850; and Sperry Gyroscope Co. Inc., Brooklyn, N. Y., $13,135.

Bill authorizing a $10,000,000 appropriation for erecting a federal airplane factory near Chicago was proposed last week by Chairman Sabath of the house rules committee. Although the resolution contends present aircraft costs are "unreasonably high", it provides the government may lease the plant to private manufacturers.

PLANT EXPANSION MARKS GROWING CANADIAN INDUSTRY

Canada's aircraft industry is showing rapid growth. A dozen firms now build airplanes and parts, employing 2500 and paying them $3,000,000 annually. In 1934 the six companies in this field had a total working force of only 162 and annual payroll of $193,000.

British military orders aggregating $200,000,000 are anticipated over the next ten years. Canadian Associated Aircraft Ltd., formed by five manufacturers, recently built two $500,000 plants and now is working on a $10,000,000 order for bombing planes for England. (STEEL, Nov. 28, p.16.)

Canadian Vickers Ltd., Montreal, has booked domestic business sufficient to maintain current output for two years. The Canadian government recently ordered four coastal patrol planes costing $500,000.

Cub Aircraft Ltd., Hamilton, Ont., has awarded contracts for constructing a 90 x 125-foot plant to cost $60,000, with equipment. British North American Aircraft Ltd., New Westminster, B. C., in the spring will build a $100,000 factory. Now under construction is an 80 x 210-foot addition to Fleet Aircraft Ltd.'s Fort Erie, Ont., plant. Production of fuselages is to begin in the new unit May 1.

Other scheduled plant enlargements: National Steel Car Corp. Ltd., Hamilton, Ont., $450,000; Canadian Car & Foundry Co., plant at Fort William, Ont., $50,000, and two plants at Montreal, $300,000.

Steel, Lead, Oil Used in Testing All-Metal Planes

■ A combination of steel superstructures, lead weights and hydraulic pressures subject aluminum-alloy structures for the Douglas DC-5 all-metal transport to scores of tests, reproducing load and operating conditions expected in the air or on the ground, while instruments accurately record deflections and stresses. A sturdy keel beam runs along the bottom of the center line of the fuselage, which is circular in section. The wing is 78 feet from tip to tip, and into it are built retractable landing gear and engine mounts. The fuselage is 60 feet long. With capacity for 16 passengers and crew of three, it is designed to serve feeder-line and short routes.

Contest To Develop Foremen's Suggestions

■ To obtain constructive suggestions from foremen on building morale among working forces, National Industrial Conference board, New York, is sponsoring a prize letter contest for foremen. Two hundred dollars in prizes, $100 for first, $50 for second, $25 for third and $5 for the next five, will be awarded.

The board points out men who directly supervise rank and file employes are in a position to sense the workers' thoughts, views, needs and reactions to management policy. The foreman himself may benefit by thinking the problem through and checking his own performance.

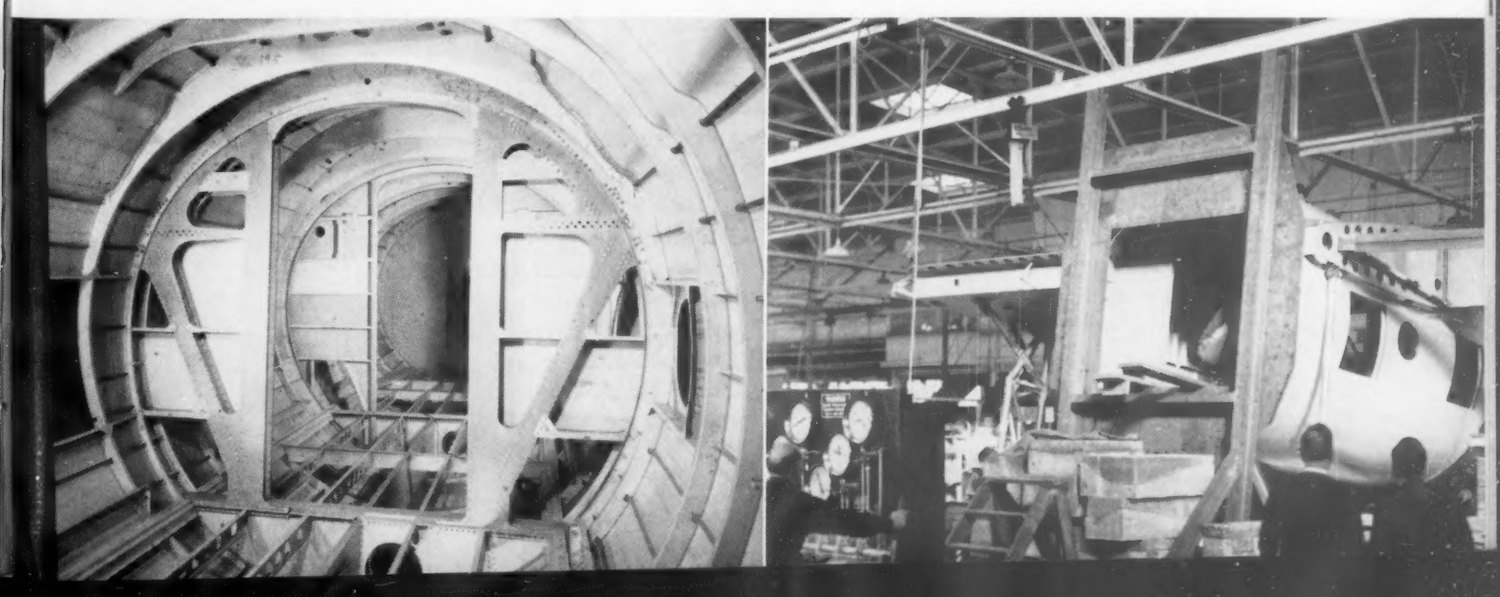
The prize letter contest was planned to make a consensus of foremen's thinking available to management. It closes April 15.

Offers Fellowships to Industrial Executives

■ Dr. Karl T. Compton, president, Massachusetts Institute of Technology, has announced a competition to select ten young industrial executives of 25 to 35 years to begin special social and economic training next June in fellowships under a grant of $32,500 by the Alfred P. Sloan foundation. Applications must be made by March 25. Fellowships range up to $1750 for single and $2750 for married men.

The foundation doubled its grant for the coming year to meet demand for executives with "enlightened social and economic objectives." The men will study 12 months in the institute's business, engineering, economic and social science departments. Opportunity will be given to concentrate on some selected field: finance, production, distribution or labor relations.

Fellowships will be awarded after consideration of records, references and consultations with employers.



Editorial

How Businessmen Best Can Help Business

■ THE WORD has spread through industry of late that this time the present administration is in earnest in promising to help business. On the basis of the record, businessmen have no occasion for jubilation over the prospect. Nevertheless, they should be prepared to take fullest advantage of any opportunity for co-operating to this end with any and all administrative officials and members of congress who give evidence of being so minded.

Businessmen will do well to remember that the country's basic need is employment at good wages for all who are able and willing to work. To be effective in their recommendations, they will have to bear this matter in mind on all occasions. The temper of public opinion still seems to be such that appeals for greater profit possibilities are unlikely to have wide acceptance unless it is generally understood that profits and employment are directly related. There will be little support for recommendations for revision of some of our existing laws unless it is generally understood that provisions of these laws and the character of their administration now prevent re-employment.

Industry Fails To Picture to the Public the Cause of Unemployment

Up to the present time industry has been singularly ineffective in painting word-pictures as to why a good many jobs have been eliminated and as to how many more jobs might be set up. Businessmen realize keenly that their path will continue to be strewn with obstacles as long as the public purchasing power is held down by reduced employment. And yet, they do not talk about this situation in terms that are significant to the public. They do not have the politician's knack of convincing the public as to what is wrong with the country and what should be done about it.

For example, when it recently was announced that the steel industry will spend about $126,000,000 for plant improvements in 1939, an attempt might have been made to interpret the significance of this figure. It would have been much more understandable to the thinking citizen had the news been conveyed to the public in substantially the following language:

"The steel industry will contribute less employment in the capital goods industry in 1939 than in any year since the middle of the great depression. It has earmarked funds aggregating about $126,000,000 for expenditure on plant improvements. These improvements will cover principally modernization of existing equipment. No new continuous strip mills, blast furnaces or open-hearth furnaces are slated for construction.

Frank Presentations of Facts Which Underlie Unemployment Are Needed

"The $126,000,000 figure compares with $165,000,000 earmarked for plant improvements a year ago and with $320,000,000 in 1937.

"Reason for the reduced capital expenditures this year is the inability of the industry to earn a reasonable profit under today's selling prices and costs. Many desired improvements will have to be deferred until such time as the industry is able to finance improvements out of profits or out of money borrowed on the basis of a profit expectancy."

Businessmen who are anxious to help business will accomplish their object best by talking always in terms which are identified with the public interest. They are more likely to succeed in getting governmental policies that are favorable to business if they relate their recommendations constantly to the basically important unemployment problem.

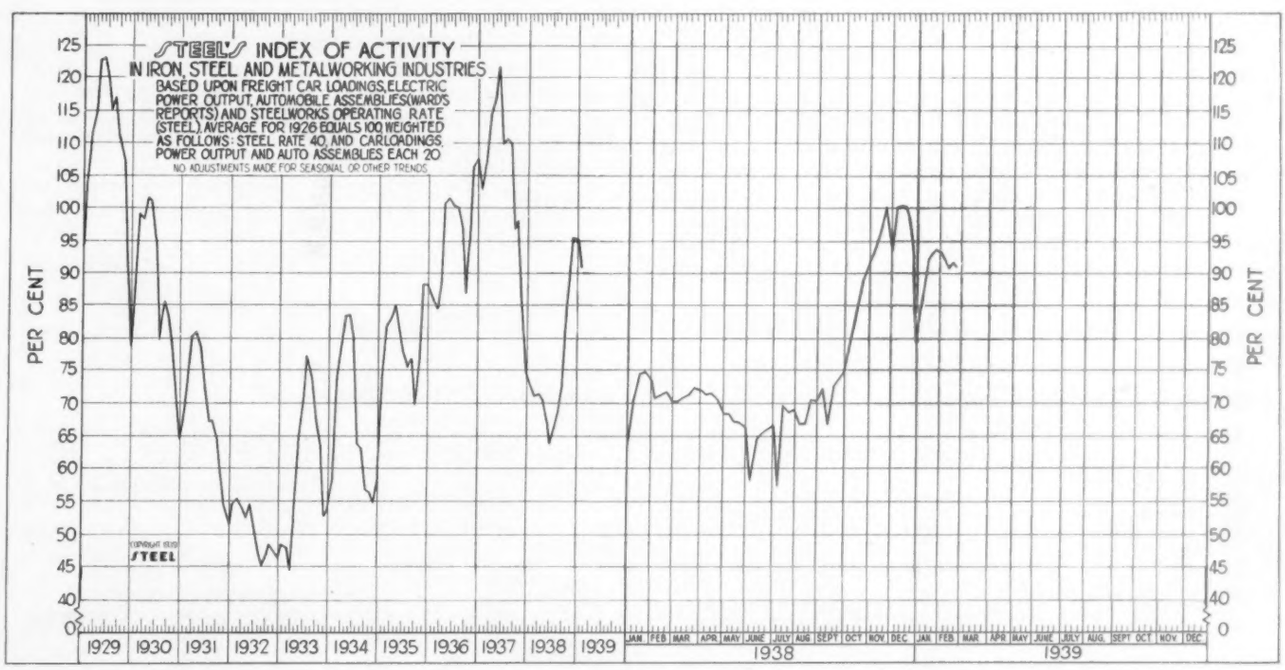
The BUSINESS TREND

Mixed Trends Force Index to Lower Levels

■ INDUSTRIAL activity has passed the half-way point of the first quarter of 1939 without exhibiting signs of reviving from the minor corrective movement which developed early in December. However, industrial leaders are confident that recovery will once again get underway during March, with the peak probably being reached in the early summer months. The anticipated improvement in industrial activity this spring will be based primarily on increased seasonal activity in the consumer goods industries, but also aided materially by the expected sharp expansion in building construction resulting from last year's federal spending program.

Reflecting a seasonal decline in two of the four business indicators from which it is composed, STEEL'S index of activity in the iron, steel and metalworking industries declined 1 point to 91.1 in the week ended Feb. 18. However, the index still remains above the low point this year of 90.7 in the week ended Feb. 4, and compares favorably with 71.9 in the comparable week last year.

Steelmaking operations recorded the third consecutive weekly increase in the week ended Feb. 18. In that week the national steel rate stood at 55 per cent, up


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
STEEL
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 1 point to 91.1 per cent in the week ended Feb. 18:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7
Dec. 24	94.8	69.5	93.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
	1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14	91.9	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2
Jan. 21	93.0	74.7	104.0	86.0	78.1	60.9	49.8	55.8	72.9	96.3	107.5
Jan. 28	92.9	73.8	99.6	86.5	79.5	62.3	50.8	56.2	72.9	97.4	109.8
Feb. 4	90.7	70.9	100.8	83.8	81.8	66.9	49.9	56.0	74.9	100.8	111.3
Feb. 11	92.1	71.2	101.9	85.9	82.7	70.7	48.7	55.5	75.4	100.9	111.7
Feb. 18	91.1	71.9	108.8	81.8	82.8	72.4	48.3	54.5	76.0	97.7	112.6

one point from the preceding week, to touch a new high for this year. The current rate of steelworks operations remains substantially above the 30 per cent level recorded at this time last year. It is encouraging to note the recent steady advance in the steel rate without the aid of large tonnage purchases from the automotive interests. However, a slight reaction in the rate of steelmaking operations is anticipated for the week ended Feb. 25, but this is considered only temporary.

The anticipated seasonal easing in automobile production for the week ended Feb. 18 materialized with assemblies declining to 79,860 units, compared with 84,500 in the preceding week. In the similar week last year production was well below the current level with assemblies totaling 59,100. Automobile production is expected to ease further to somewhat lower levels during the week ended Feb. 25, due in part to labor disturbances. Early estimate of January automobile sales of approximately 195,000 units indicates an increase of 34 per cent over the January, 1938, volume.

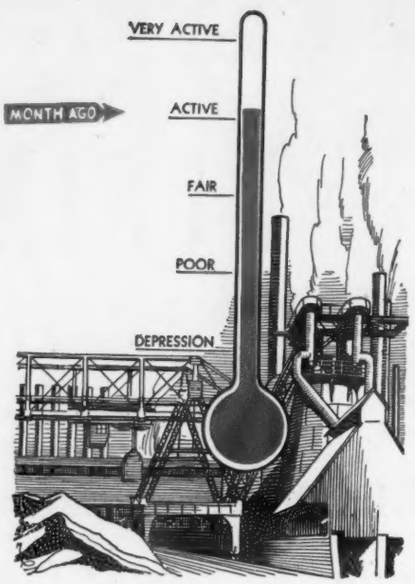
Revenue freight carloadings recorded only a moderate increase in the week ended Feb. 18 to 580,071 cars, compared with the 579,918 loaded in the preceding week. The current level of freight traffic is substantially above the 535,790 cars reported in the same week last year and closely compares with the 586,712 cars loaded in the comparable week during 1936. Electric power consumption declined seasonally to 2,248,767,000 Kilowatt-hours in the week ended Feb. 18 from the 2,268,387,000 kilowatt-hours produced in the previous week. A year ago power output was placed at 2,059,165,000 kilowatt-hours.

Where Business Stands

Monthly Averages, 1938=100

	Jan., 1939	Dec., 1938	Jan., 1938
Steel Ingot Output	135.5	133.7	73.7
Pig Iron Output	136.2	137.9	90.1
Freight Movement	100.3	100.2	98.3
Building Construction	....	128.6	53.7
Automobile Production	159.9	183.9	130.2
Wholesale Prices	97.7	98.0	102.9

Industrial Weather



TREND: *Unchanged*

Reflecting a continued active demand from abroad and perhaps of more significance a moderate improvement in domestic requirements, the upward trend in machine tool orders was extended during January. The National Machine Tool Builders' association's order index number of 150.8 for January not only exceeded the December figure of 146.5 but also represents a new high since October, 1937. The three months moving average index of orders also recorded an encouraging gain during January, rising 10.9 points to 136.5 for the month compared with 125.6 in December.

Reversing the upward trend of machine tool orders, demand for foundry equipment declined during January, according to the Foundry Equipment Manufacturers association. The association's net order index for January was placed at 122.3, off 19.5 points from 141.8 reported during December. However, excluding December the association's index remains at the highest level since November, 1937.

The Barometer of Business

Industrial Indicators

	Jan., 1939	Dec., 1938	Jan., 1938
Pig iron output (daily average, tons)	70,448	71,378	46,608
Machine tool index	136.5	125.6	129.6
Finished steel shipments	789,305	694,204	518,322
Ingot output (daily average, tons)	122,571	120,891	66,626
Dodge building awards in 37 states (sq. ft.)	.....	48,548,000	19,200,000
Automobile output	353,946	407,016	288,074
Coal output, tons	35,530,000	36,230,000	30,950,000
Business failures; number	1,263	875	1,377
Business failures; liabilities	$19,122,000	$36,528,000	$21,415,000
Cement production, bbls.	.....	8,066,000	4,534,000
Cotton consumption, bales	.....	565,000	435,000
Car loadings (weekly av.)	575,616	575,003	564,106

Foreign Trade

	Jan., 1939	Dec., 1938	Jan., 1938
Exports	.....	$268,756,000	$289,437,000
Imports	.....	$171,474,000	$170,763,000
Gold exports	.....	$16,000	$5,067,000
Gold imports	.....	$240,542,000	$7,183,000

Financial Indicators

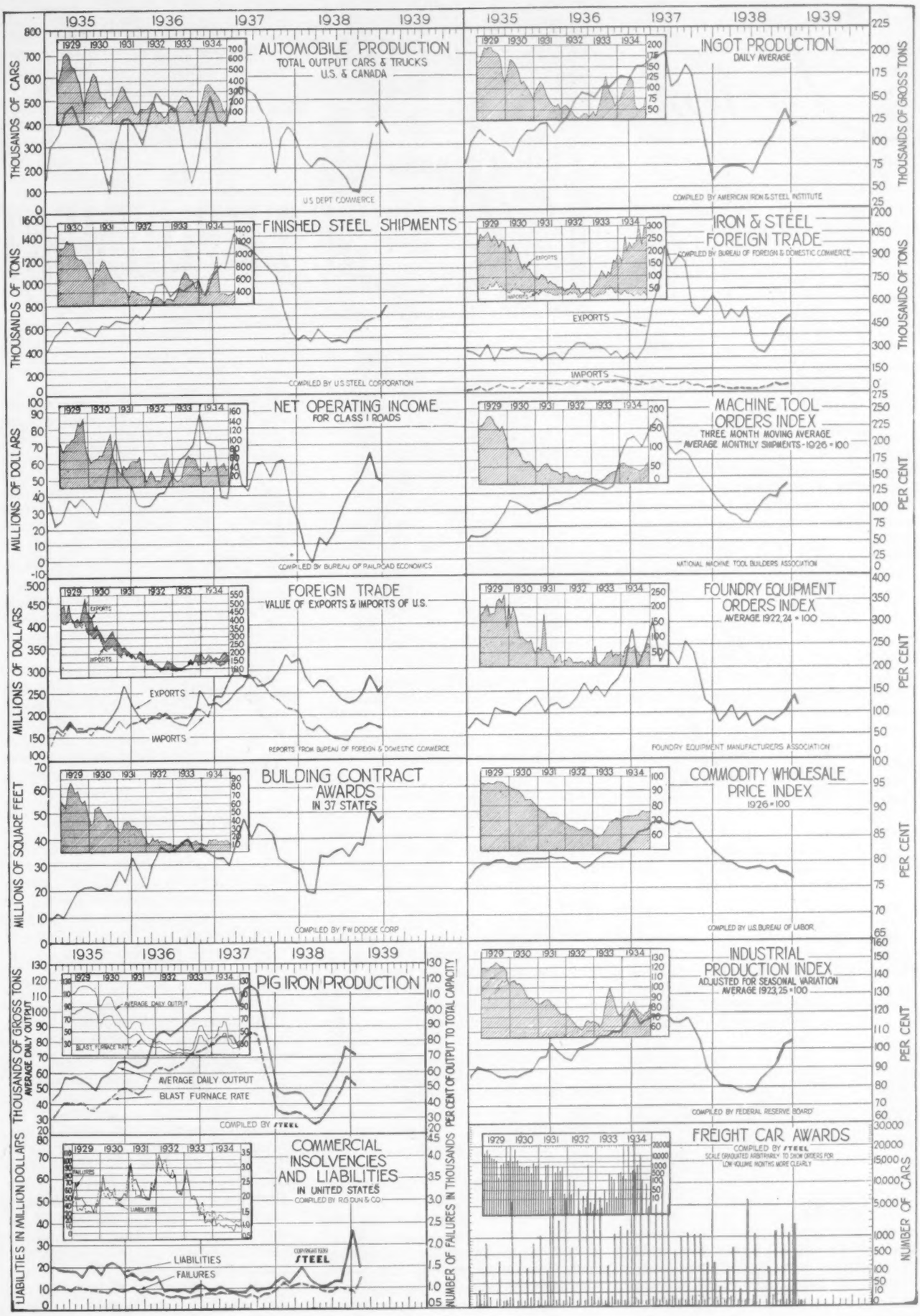
	Jan., 1939	Dec., 1938	Jan., 1938
25 Industrial stocks	$181.82	$186.99	$159,53
25 Rail stocks	$23.64	$23.74	$23.18
40 Bonds	$71.79	$71.39	$71.44
Bank clear'gs (000 omitted)	.....	$27,697,000	$21,798,000
Commercial paper rate (N. Y., per cent)	½–⅝	⅝	1
*Com'l loans (000 omitted)	$8,233,000	$8,412,000	$9,038,000
Federal Reserve ratio (per cent)	83.9	83.7	80.2
Railroad earnings	†$49,873,177	$49,664,682	$25,994,857
Stock sales, New York stock exchange	25,185,780	27,490,471	24,145,011
Bond sales, par value	$159,507,350	$217,717,070	$166,080,100

*Leading member banks Federal Reserve System.
†December, November and December, respectively.

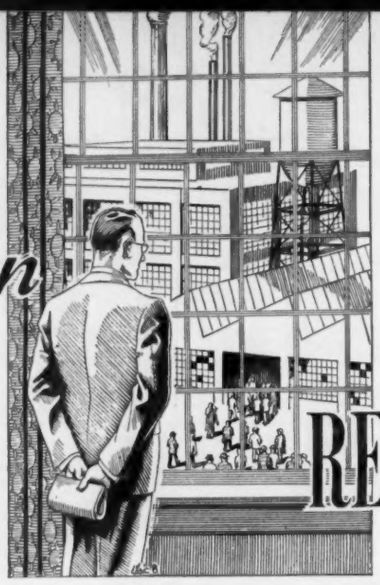
Commodity Prices

	Jan., 1939	Dec., 1938	Jan., 1938
STEEL'S composite average of 25 iron and steel prices	$36.36	$36.36	$38.95
U. S. Bureau of Labor's index	*76.8	77.0	80.9
Wheat, cash (bushel)	$0.87	$0.81	$1.13
Corn, cash (bushel)	$0.66	$0.67	$0.76

*Preliminary.


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS
IN 37 STATES
MILLIONS OF SQUARE FEET
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
LIABILITIES
FAILURES
COPYRIGHTED BY STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW-VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ PREVIOUS contributors to the Forum have pointed out that the thing called "business" is not primarily a few huge corporations but rather the thousands of organizations of small and medium size. Our contributor this week makes the following significant comment: "These small and medium size organizations, taken in the aggregate, constitute the main hope of this nation as far as employment is concerned—according to my way of thinking."

Henry P. Chaplin, treasurer and general manager of the Cone Automatic Machine Co., Windsor, Vt., learned a trade by working in the shop. Prior to coming into the machine tool business about 10 years ago, he had long experience in plant management in New England and was associated with shoe manufacturing enterprises. When the United States entered the war, Mr. Chaplin was one of the first to be commissioned in the Motor Transport corps. He is keenly interested in local and state affairs, and in the work of the New England Council.

Mr. Chaplin pictures the employment responsibilities resting upon the management of an industry in a small town and he tells of a system which, by training the older people already in the organization, constantly makes room for younger ones at the bottom, these being drawn from the reservoir of "local talent." Success of such a program, he admits, is predicated upon sincere belief in the truth of this statement: "There is no substitute for a good job in private industry."

—The Editors

■ CONTINUING a policy followed by the late Frank L. Cone, founder of our company, we concentrate our employment efforts first and foremost upon local people—the settled inhabitants of our village and its surrounding farms. It was Mr. Cone's belief that if every employer in this country would do everything within reason through the conduct of his own business to improve the local employment situation, the so-called national problem of unemployment would be struck effectively at the roots.

This theory of the situation is in line with what E. S. Sawtelle said in his Forum contribution in the Jan. 30 issue of STEEL, to the effect that this thing we call "business" is not primarily the few great corporations, but rather the very large number of organizations of small and medium size. Some of these last may be well known only locally, but many of them are the mainstays of the communities of which they are a part. These small and medium size organizations, taken in the aggregate, constitute the main hope of this nation as far as employment is concerned—according to my way of thinking.

While our town is not a "one industry" community, it is a fact that out of its total population of 4000, our plant—with its present payroll of 350—is the main source of support for approximately 1200 people—which includes of course both workers and dependent members of their families. This situation we regard as a very serious responsibility. Therefore we are bending every effort not only toward making existing jobs in our plant as profitable and secure as possible but also toward the creating of additional jobs as rapidly as is safely possible under today's difficult economic and political conditions.

Machine tools have been built in Windsor, Vt. for more than a hundred years—by the fathers and grandfathers and great grandfathers of skilled men who are with us today. As a result, traditions have developed which cause many of the growing boys to look forward eagerly toward "going into the shop" at the earliest possible opportunity. Naturally we value such traditions, but at the same time we value adequate education and training much more than we do any traditions.

Good Education Fostered

When we become acquainted with a local boy who shows real interest in and aptitude for our work (we make it a point to know them), we do encourage him. But at the same time we urge him not only to finish high school, but also to go to college if he possibly can do so. It is our belief that every boy who has aspirations in the machine tool industry these days should have at least a high school education.

Assuming, however, that the young man in question does have to go to work when he finishes high school (or in some instances before), we see no reason why his education and training should cease at that point just because he is unable to go to college. Neither do we see any reason why any intelligent, ambitious man should long remain on one of the lower levels in our organization if continued study and training can prepare him to occupy a position at a higher level—to his and our own advantage.

Our company, like any growing

concern, from time to time has new jobs opening up as well as old ones which must be refilled. Why should we under any ordinary circumstances go outside our highly specialized and loyal organization to find men, or why should we go outside of our own community? Why not foster and encourage the industrial development and economic betterment of our own personnel and townspeople, just as much as we encourage constant improvement in the design and production possibilities of the machine tools which we build?

The only logical excuse for a "locally unfavorable" answer to any one of these questions would be that men with the required talent and training might not be available within our organization and our community. Now as for mechanical talent, I have already intimated that there is an ample reservoir of it right here among the inhabitants of our own village and of the surrounding hill farms. Mr. Cone himself was born and brought up on one of these farms, as were many of the best men now in our employ.

As far as training is concerned, that certainly cannot be "inherited", nor can it be "picked up" as it once was when design, construction, tooling and marketing of machine tools were all so much simpler than they are today. Training, therefore, is the vital problem in our program for utilizing local talent in our business. We recognized that a long time ago, have given a lot of thought to it, and believe that we have found the solution. At least, our present system is accomplishing results.

Apprenticeship Out-of-Date

Years ago the old-fashioned system of apprenticeship was in vogue among the forerunners of our company and it produced several figures of national repute in the machine tool industry. With the passing of the old order however, this system encroached too much on public school education, and it was too slow in its results. Furthermore, modern specialization in the shop has eliminated to a large degree the need for the old-fashioned "all around mechanic" who was the finished product of the old-time apprenticeship system.

Next came co-operative courses in high schools. In many cases these have proved very successful and are doing a splendid service for industry—especially in the larger manufacturing centers. The co-operative experiment was tried in our local high school but unfortunately it was caught by the 1929 depression before it really got under way.

Had our co-operative project matured it undoubtedly would have proved helpful to us by making available beginners with fundamental machine shop training. However, that never was our main need. Our problem was to continue the education and special training of older men already working for us. When these men advance, we have found through long experience that it is entirely practical to refill the ranks at the bottom with intelligent local boys—preferably high school graduates—who have mechanical talent but no formal shop training.

In the past, several men in our shop developed themselves through home study. We have great admiration for any man with the ability and determination to carry through to completion a course of home study—especially an engineering course. As our town is too small to support an industrial night school, correspondence courses were the only organized systems of post-school education and training available to our people until we ourselves took a hand in the situation. These cases where some of our workmen "lifted themselves up by their own bootstraps" through home study, gave us the idea for the "post graduate" system of training which now is actively and successfully in operation in our plant.

Henry P. Chaplin
Treasurer and General Manager
Cone Automatic Machine Co. Inc.
Windsor, Vt.

Briefly, here is what we did. We organized a school within our shop for our own workmen—regardless of their age or length of service. Classes are held each working day in a well-equipped schoolroom fitted up within the plant. Hours are between 4:15 and 6:00 p. m. for those who cannot very well make a special trip back to the plant to attend classes. Other classes are held two nights a week from eight o'clock on, and there is a special class for office boys and girls one afternoon each week. Courses are available in machine shop practice, shop mathematics, blueprint reading and fundamental metallurgy. Provisions are made for advanced courses in these and other related subjects for those anxious to progress beyond the levels required in the shop itself.

In addition to the large group of able instructors which volunteered from among our shop foremen, metallurgists and engineering staff, we have a full time man in charge of our educational program. He is a graduate of one of the leading engineering schools and not only has had wide experience in conducting courses in shop practice and technical subjects, but also many years of practical shop and engineering experience. This last is an important factor in dealing successfully with practical shopmen.

Plan Wins Quick Support

It might surprise some industrialists to know of the spirit of enthusiasm with which our men accepted our plan and the remarkable extent to which they immediately took advantage of it; also the persistence with which they have pursued their studies and the number who are continuing into the more advanced courses. We had counted on about 50 taking up the work when the program was launched. Instead, 287 immediately "signed up" without being subjected to any pressure on our part, and practically all have continued the work with keen enthusiasm. The plan certainly has proved of distinct benefit to them, and aside from this benefit to individuals in our organization, we recognize it is a good investment from the strictly business point of view. To me it is inspiring to see men from 20 to 70 years of age, sitting side by side in class, all equally interested.

Vermonters of course are supposed to be "different", so perhaps our program might not work elsewhere in the United States. We do seem to be different politically (or were during the last presidential election) and some of our economic ideas may be looked upon as rather old-fashioned. For instance, folks here in Vermont still prefer the "earned dollar" to the "charity dollar"; they still like to do an honest day's work; they believe in balanced budgets; and "men" and "management" get along well together—apparently to the benefit of all concerned. As a matter of fact, Vermonters seem to be of the opinion that Governor Ray Baldwin of Connecticut was right when he said in his recent Lincoln's birthday speech in New York: "There is no substitute for a good job in private industry".

Mill Uses

Of Pipe

Huge industrial piping installation forms important part of new steel mill. Sizes up to 48 inches and pressures up to 3500 pounds are employed. Metal piping is electrically welded. Other joints used only at valves and equipment connections

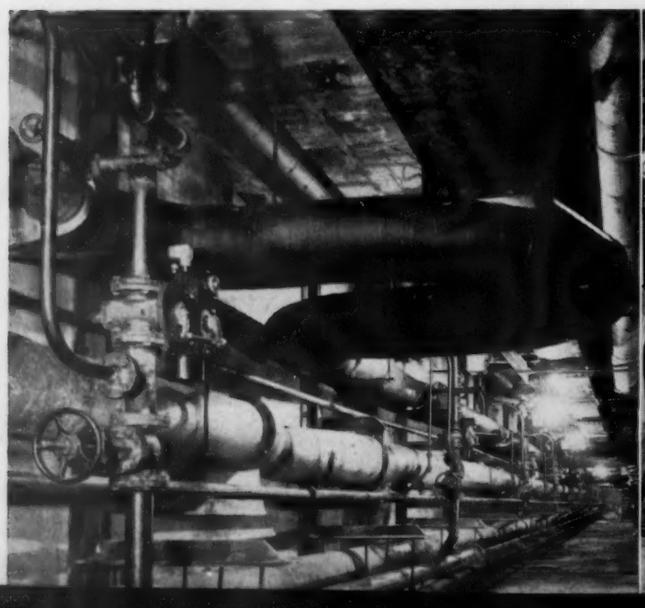
■ LAID END to end, pipe lines required for the operation of Irvin works, Carnegie-Illinois Steel Corp., Pittsburgh, would stretch 60 miles. Layout and installation involved one of the largest industrial piping contracts ever undertaken. General mill piping was designed, fabricated, and put in place by Power Piping division, Blaw-Knox Co., Pittsburgh.

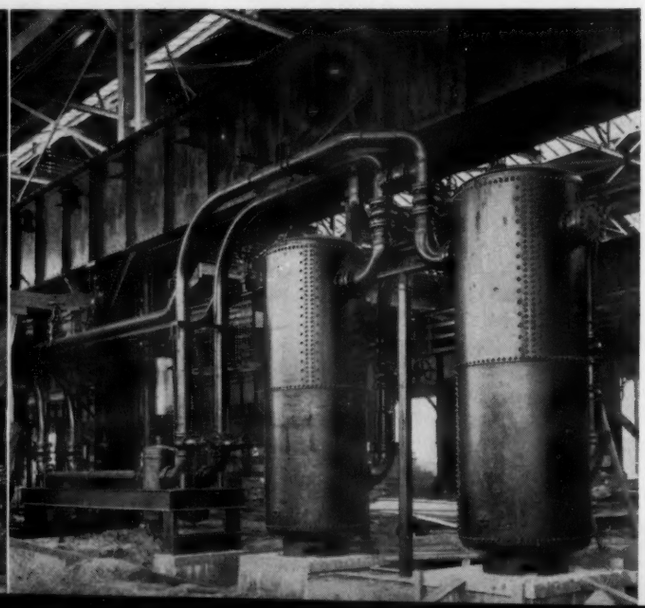
Piping was started when ground was broken. Individual units were completed according to a schedule to allow sections of the plant to operate independently. Shop prefabrication of pipe avoided costly delays in the field, cut costs of erection and improved appearance of the work.

Steel, wrought iron, lead, copper, rubber and glass pipes in sizes up to 48 inches in diameter carry steam, water, air, gas, palm oil, acids and lubricants.

Steam is generated in two boilers, utilizing waste heat from three slab heating furnaces or coke oven gas; also in two boilers fired with coke

Left, piping in tin mill tunnel includes 28 different pipe lines. Right, piping on coolers and tanks of compressed air system carries pressures ranging from 100 to 1500 pounds per square inch





breeze or coke oven gas. About ten miles of piping carries steam to sections of the plant where it is used for cleaning, melting palm oil and for other work. Steam in 12-inch mains at 200-pound pressure traverses the full length of the mill. Underground lines pass through tile duct with glass wool insulation; overhead lines are supported by roof trusses and pass between buildings 50 feet above ground. Expansion U-bends are placed every 250 feet. Steam condensate is trapped and discharged into flash tanks which empty into drainage sewers.

Three Kinds of Water

A station with screening and liming apparatus and three pumps having total capacity of 25,500 gallons per minute pumps water from the Monongahela river through a 42-inch line for a distance of about a mile to a reservoir 425 feet above the river. From here, another 48-inch line supplies the entire mill by gravity. Part of the water goes from the reservoir to a filtration plant and from there to the mill through a 30-inch line. City water for drinking also is furnished through an 8-inch line from adjacent Clairton. Thus the plant is provided with sources of raw, filtered and drinking water.

The raw river water, after liming and screening, is used for spray cooling of rolls during rolling, for cooling lubricants on pumps and other machinery, and for the fire protection system.

Filtered water is piped parallel to the raw water throughout the plant. It is used in hydraulic systems, for making pickle baths, cooling bearings, and wherever water free from foreign matter is required. Pressures range from 600 to 3500 pounds per square inch. Regardless of size, piping is electrically welded, using no screwed or flange connections except at valves and equipment connections. Water and hydraulic lines contain about 40 miles of piping. Double loops around each building insure continuous service in case of breaks. Hydraulic systems are fitted with pumps for building pressures up to 2000 pounds, as well as with both air and weighted accumulators for maintaining steady pressures where required.

The fire protection system includes automatic sprinklers, steam smothering and foamite systems.

Compressed air is supplied by three stations containing a total of five compressors. Air lines are looped around every building of the mill so air can be provided at any spot by any of three stations, separately or simultaneously. Air pressures range from 100 to 1500 pounds per square inch. Chief use is to control pressures on the pneumatic-hydraulic systems.

Both natural and coke oven gas are used for firing the slab heating and annealing furnaces. There are 154 radiant tube annealing furnace bases. Four bases are provided for each radiant tube furnace top, tops being designed and piping provided so that they may be moved from base to base without heat loss.

Coke oven gas is drawn from a line running between other company properties in Clairton and Homestead by means of two 24-inch lines which run to 20-inch welded overheads passing through roof trusses in the buildings and underground mains outside.

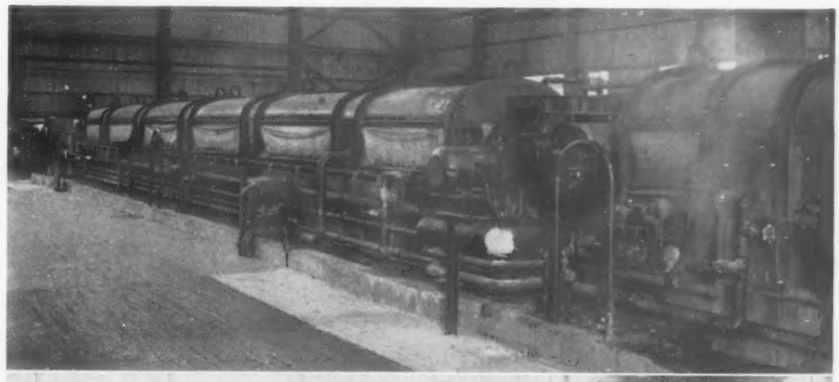
Natural gas lines contain more than a mile of underground 12-inch pipe with Dresser couplings connecting with the natural gas supplies of the company's other mills in the vicinity.

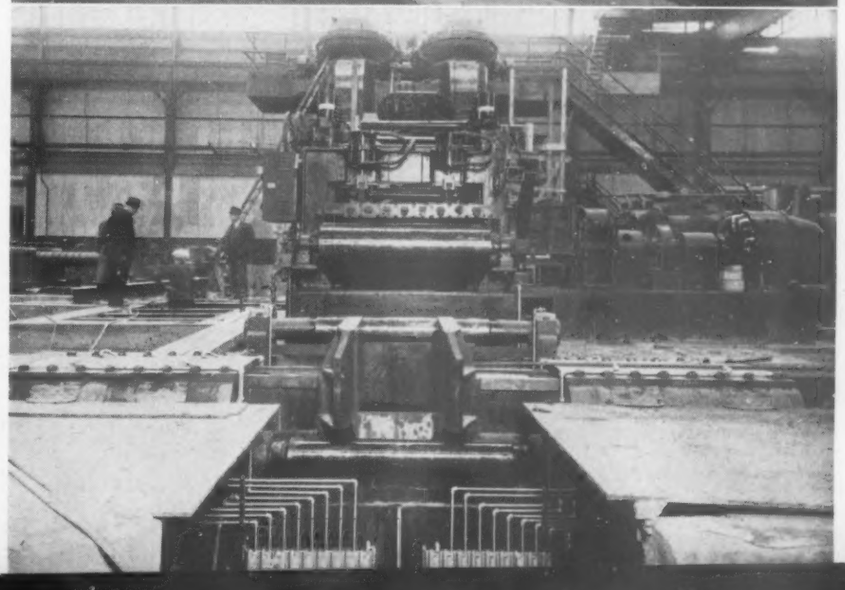
Palm oil used in cold reducing, pickling and tinning is unloaded from tank cars in the yard and piped to a 50,000-gallon palm oil storage tank. A parallel steam line wrapped with each palm oil line maintains proper flowing temperature. An efficient reclaiming system requiring rubber, glass and copper piping as well as rubber valves and fittings, recovers the expensive palm oil. This layout is said to be the first major industrial application of a palm oil recovery system utilizing rubber fittings and pipe.

A mill of this size and type requires extensive use of various industrial acids for pickling and for the oil recovery system. Four central storage tanks for sulfuric acid used in pickling have a total capacity of 200,000 gallons. The white

(*Pleast turn to Page* 83)

Welded construction makes a particularly fine appearing job on these 36 and 24-inch water lines





Upper, piping for electrolytic cleaning equipment includes steam, water and acid lines. Lower, some of the piping used in the pressure greasing system

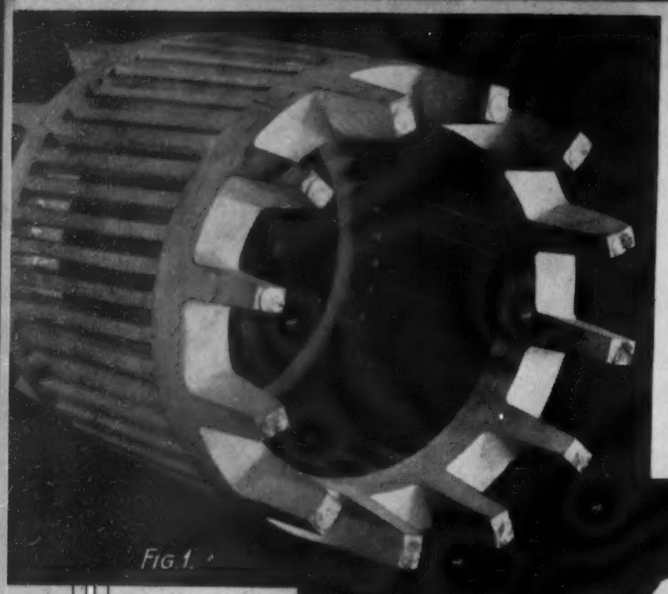


FIG 1.

FIG. 2

FIG. 3.

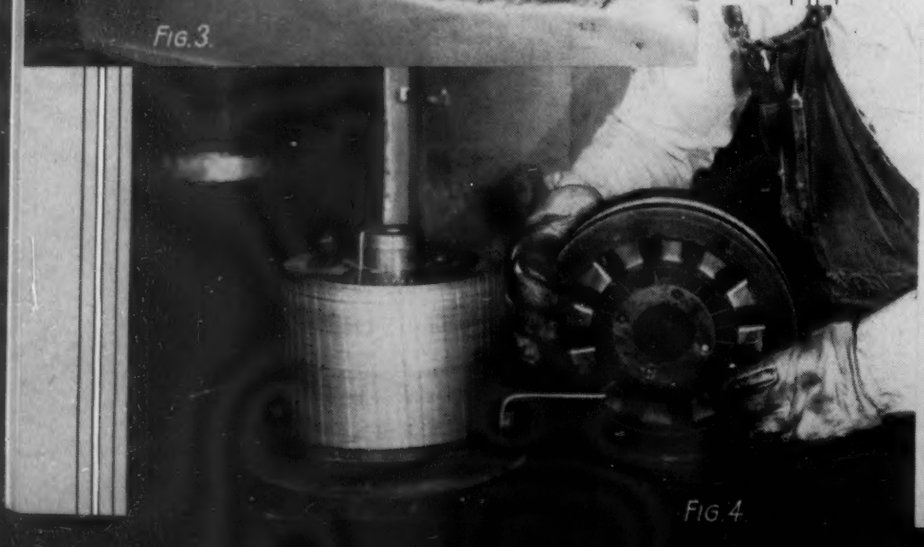


FIG. 4

ROTORS

"Wound"

■ NECESSITY of obtaining good electrical connections between the rotor bars and end-rings of squirrel-cage induction motors has led in succession from soldering, brazing and welding to the present method where rings, bars and ventilating fans are cast all in one piece. This construction is dramatically shown in Fig. 1 where the iron core surrounding the aluminum bars has been etched away with acid.

Pressure casting avoids risk of loose or defective joints and also permits changes in the shape and cross-sectional area of the bars which would not be practical were the windings made from bars or rods of standard gages. Since the rotor "windings" are cast under high pressure, much greater overall uniformity is obtained also.

By modifying the shape and area of core slots, and consequently of the bars cast in them, almost any desired combination of starting torque, starting current and performance characteristics can be obtained. In fact, much of the flexibility of modern squirrel-cage motor drives is due to this feature.

Production Methods Vary

There are several ways of producing cast rotor "windings." The method used at Reliance Electric & Engineering Co., Cleveland, is typical. Core laminations, Fig. 2, first are stacked on a mandrel having a skewed key. This produces the necessary rotor bar "skew" to provide an even torque in all rotor positions and to eliminate the tendency to "lock" when starting. The assembled cores and mandrel are preheated, Fig. 3, so as not to chill the flow of metal before it completely fills all portions of the mold.

The core is assembled in a 3-section mold, Fig. 4. The bottom section is solid except for a series of small openings, or gates, through which the metal enters during casting. The other sections form the mold itself and produce the short-

by Casting

circuiting end-rings and fans. The punched holes in the rotor laminations form the bar portions of the mold.

Before the casting operation, the mold assembly is compressed and the rotor core length is measured and adjusted to the proper length, as shown in Fig. 5. This is a preliminary operation in the casting press which has two separate air cylinders. Upper cylinder is used to compress and hold the mold and the lower cylinder forces molten metal into the mold under high pressure.

Metal Is Poured

After the rotor core length has been checked, the mold is moved to one side of the press bed. The casting pot is next lined and molten metal, held at a thermostatically controlled temperature, is poured into it, Fig. 6. Mold assembly now is placed over the casting chamber. After a definite time delay, the mold is clamped and the molten metal forced into the mold at high pressure. This pressure is maintained long enough to allow the metal to set completely, a time interval that is a function of the rotor size and metal material.

After casting, the lower or gated section is sheared off and the ring molds removed as in Fig. 7 revealing the end-rings and fans cast as an integral piece. The finishing operation consists of pressing out the mandrel, Fig. 8, and broaching in the core a straight keyway used to lock the rotor to the shaft.

For normal torque motor characteristics, aluminum is used; where high or semi-high torque characteristics are needed, alloys of Dow metal are employed. Use of this integrally cast method is rapidly being extended to large sizes. Rotors up to 100 horsepower and 1200 synchronous revolutions per minute are now being made with cast rotors, and this is to be extended up to 200-horsepower motors shortly.

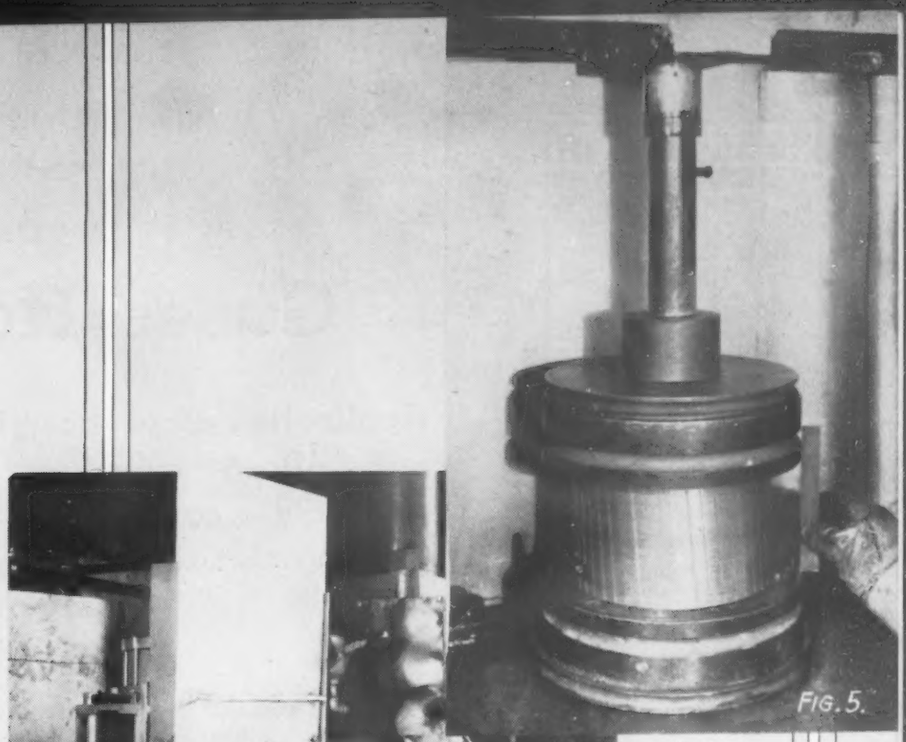
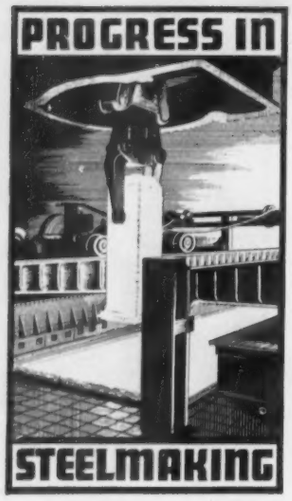


FIG. 5.

FIG. 6.

FIG. 7.

FIG. 8.



Gases Help Steel

Application of oxyacetylene processes in steel mills affords many cost and fatigue-reducing shortcuts in conditioning slabs, lancing and cutting, maintenance and repair work as well as in welding, hard facing and flame hardening

By W. S. WALKER
The Linde Air Products Co.
New York

■ FEW INDUSTRIES find the oxyacetylene process as vitally essential as does the modern steel mill. It is used not only in processing steel itself but also for countless operations in fabrication and maintenance of mill equipment.

Applications at the Riverside plant of Otis Steel Co., Cleveland, are typical of those applied in many mills. Here oxyacetylene operations include flame conditioning, lancing, open-hearth maintenance, machine cutting and welding work.

A complete piping system for distribution of oxygen at this mill starts with the pipe line first running the entire length of the open-hearth building, where stations are located at each open hearth as well as along the pouring platform. At the end of the building are several additional stations for open hearth maintenance operations.

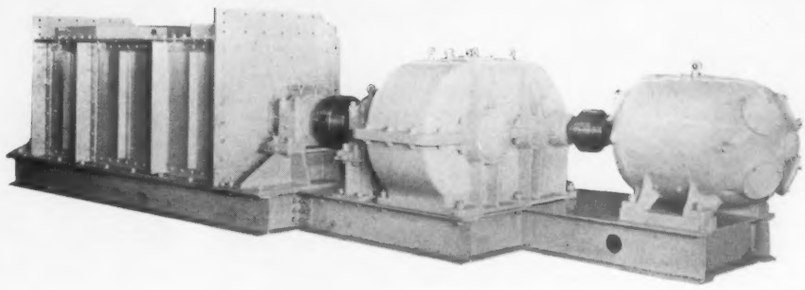
From the open hearth oxygen piping crosses the slab yard. Here there are ten or twelve stations for deseaming operations and one for a cutting machine installation. Piping next runs the length of the blooming mill and strip mill, then crosses the scrap yard and finally branches with one section going to the locomotive shop and the other to the coke works and blast furnaces.

The welding shop has its own sup-

Fig. 1. (Upper)—Conditioning slabs at Otis Steel Co., Cleveland, with the oxyacetylene torch. Fig. 2. (Lower)—Starting the oxygen lance to cut up a skull

The American

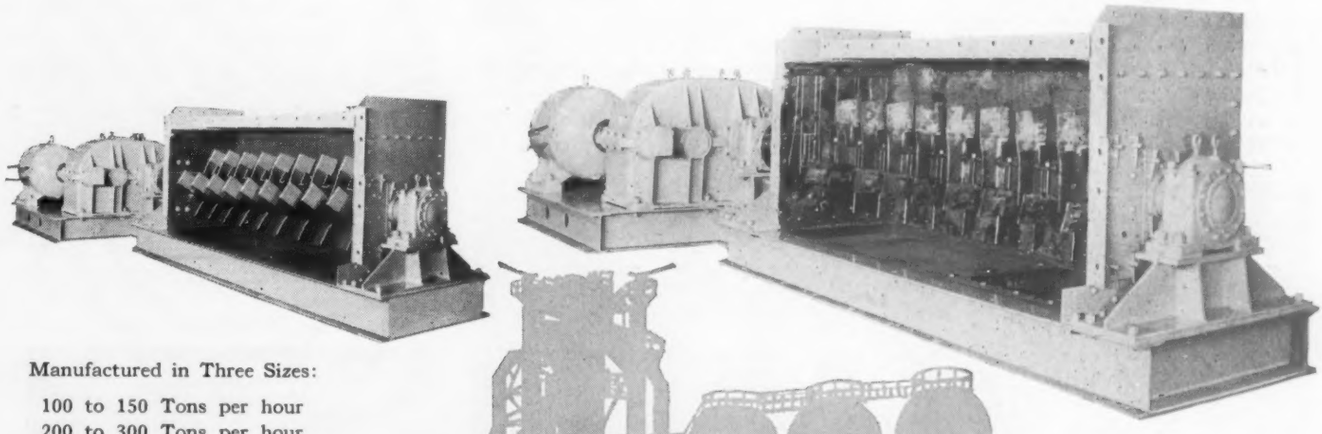
SINTERING PLANT PUG MILL



The severe, abrasive action of mixing the various materials used in sintering at the Steel Works Sintering Plant has always proved a maintenance problem to those employing light and inferior constructed equipment. Pug mills intended for service of this nature *must* be of rugged design, efficient for long periods of continuous operation without repairs and must possess an overall simplicity for ease of inspection.

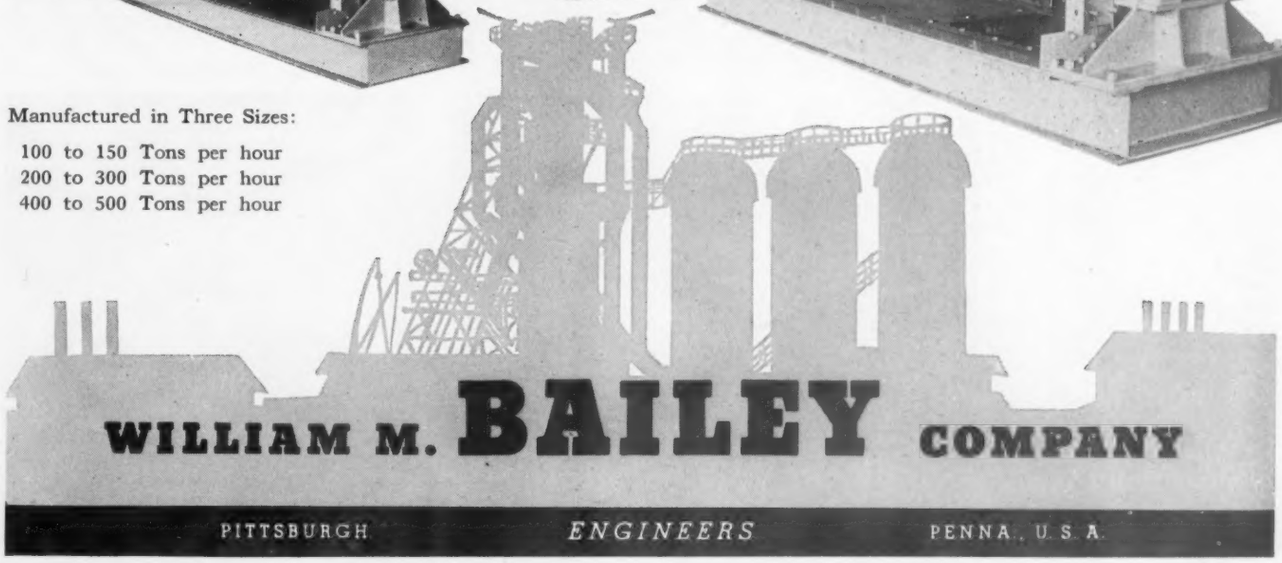
THE AMERICAN SINTERING PLANT PUG MILL (illustrated) is a perfection of engineering skill based upon the experience of many years with the blast furnace and associated industries. This mill pugs a mixture of 50% ore concentrates, 25% flue dust and 25% sinter fines weighing approximately 145 lbs. per cubic foot with 5% moisture. Of the three capacity sizes built, all have proven most efficient on this mix. The mill is so designed that the paddle shaft may be readily checked and paddles replaced if necessary. Paddles being made of either structural material with a stellite face or manganese steel castings. The original mill, in operation since 1931, has shown a marvelous job on a 200 tons per hour capacity—handling all the material going into a double strand sintering plant.

General specifications and operating literature will be mailed upon application.



Manufactured in Three Sizes:

100 to 150 Tons per hour
200 to 300 Tons per hour
400 to 500 Tons per hour



WILLIAM M. BAILEY COMPANY

PITTSBURGH *ENGINEERS* PENNA., U. S. A.

Fig. 3—Repairing open-hearth door frames

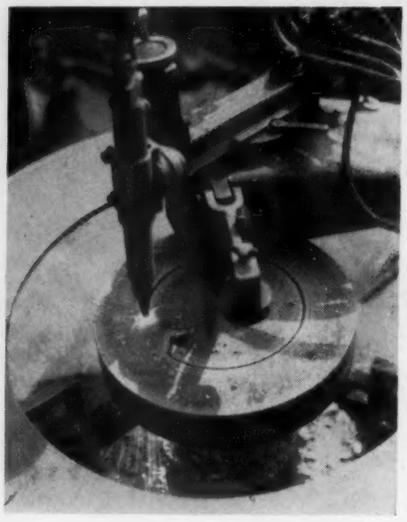


Fig. 4—Portable gas cutting machine set up to cut rings

ply of oxygen and acetylene. In addition, there are over 100 portable welding and cutting outfits at various points about the mill.

Flame conditioning of slabs and other semifinished shapes is done with a hand deseaming blowpipe. Slabs from the bloomer are laid out, cooled, sorted and inspected in the slab yard. Then they are moved by crane to the deseaming bed where the scale is removed and surface defects indicated by chalk marks. Defects then are removed by deseaming as shown in Fig. 1. A partly conditioned slab is also shown.

Most of the cuts are started at edge of slabs, so the blowpipe is not equipped with a starting rod attachment. However, for a majority of operations a starting rod attachment is used. This shortens the time required for preheating when the cut is started on a flat surface. When starting on edge of a slab, blowpipes without starting attachment first are held horizontally about two seconds for preheating, and then the nozzle is raised to an angle of 30 degrees and the oxygen turned on. Nozzle proceeds across the work at about 30 feet per minute producing a shallow path 1½ inches wide and varying from ⅛ to ¼-inch in depth.

Lancing answers a definite need on many types of work. It is used for opening tap holes in blast furnaces and open-hearth furnaces, for tapping slag from soaking pits, for cutting up spills and skulls, and for many other operations involving piercing or severing of extremely heavy masses of iron and steel.

The oxygen lance is used in cleaning the open-hearth hole at the Otis plant. Lance usually consists of standard ¼ or ⅜-inch black iron pipe approximately 20 feet long connected to a supply of oxygen at a pressure between 75 to 125 pounds per square inch.

Starting methods vary. At the blast furnace it is usually from a pile of burning coke, while in severing skulls a cutting blowpipe is first used. At the open hearth, the heat of the molten metal in the furnace is sufficient to start the cutting reaction.

In cutting skulls, a torch is used for about a half minute to start the reaction. The skull is first pierced with the lance about 6 inches from the top, after which the upper section is cut away, and then the lower section cut. A 6-ton skull is severed in about 3 hours. Fig. 2 shows start of a skull cutting operation. Also a cut skull is shown at the left.

Open hearth maintenance work involves a special welding department which handles nothing but maintenance of open-hearth furnaces, particularly the repair of water-cooled doors and door frames. Repairs are frequent so work is scheduled on a semiproduction basis. The eight open hearths in this mill have 40 doors. On an average three door frames are repaired daily. One cutting operator, three welding operators, and one boiler maker handle this work.

Where doors and frames are

Fig. 5. (Left)—Conveyor links in foreground and ladle dog in back were cut with the portable machine. Fig. 6. (Right)—Sewer covers machine cut from 1½-inch plate

cracked, the cracks are cut out and then welded tightly closed. Usually frames are badly worn and cracked, necessitating replacement with whole sections.

Fig. 3 shows door frames being repaired. When replacing fronts of door frames, the steel plate is first cut to shape, then heated and bent over a forming block. Damaged sections then are cut out and the new front welded in place. This same department also maintains open-hearth burners, tuyeres, flue dampers and other miscellaneous parts.

Cutting Unit Is Useful

Numerous machine cutting operations are handled by a portable oxyacetylene cutting machine housed in a small shed adjoining the blooming mill at one end of the slab yard. This machine fabricates a wide variety of parts needed in maintaining steel mill equipment. By locating the cutting machine in the slab yard instead of in the welding shop, it is conveniently near the large slabs and plates often required for shaping the parts. Figs. 4, 5 and 6 illustrate typical applications of this equipment.

Fig. 4 shows operation of cutting out the center scrap portion of a disk used in fabrication of blooming mill carrying rolls. The starting hole here is made with a hand cutting torch, and cutting speed of machine is 9 inches per minute. Each of the carrying rolls is made up of 11 rings shrunk on a shaft and then welded in place.

Fig. 5 shows conveyer links in the foreground and a ladle dog in the background. Fig. 6 shows sewer covers machine cut from 1½-inch plate. The dimensions of the grating holes are 1 x 5 inches. Other parts regularly produced are gag blocks for hydraulic shears (8 inches thick), lips for blooming mill spindles, all types and sizes of sheaves, and other parts required for mill maintenance.

Welding shop operations include a wide variety of work encompassing hand cutting, steel welding, bronze welding, hard facing and flame hardening operations as the principal acetylene applications.

Flame hardening applications in this mill include all sorts of gears such as for vertical rolls and line shafts, brake shoes and brake bands, wobbler pads, guide bars, rollers and pins, leveler rolls, pinions and sprockets. Hard facing is used for lengthening the life of rolling mill guides, shear blades, filler sleeves, coke-pusher shoes, gag-press hammers, ingot-crane tong points and other parts subject to heat and abrasion.

Fig. 8—When this bronze slipper for a universal spindle wears ⅜-inch, it is rebuilt with about 125 pounds of bronze welding rod as shown here

Fig. 7 shows worn teeth of a bevel gear being trimmed to shape with an oxyacetylene torch. The teeth then are rebuilt with wear-resistant rod. Fig. 8 shows a bronze slipper for a universal spindle being rebuilt by bronze welding. When the spindle wears ⅜-inch, it is rebuilt with about 125 pounds of bronze welding rod.

These operations may be regarded as typical of many others employed in maintenance work in this and other steel-producing plants.

Fig. 7—Trimming worn teeth prior to rebuilding with wear-resistant material

Heat Treatment by Bullens Is Revised

■ *Steel and Its Heat Treatment, Vol. II*, by D. K. Bullens; 491 pages, 6 x 9 inches; cloth; published by John Wiley & Sons Inc., New York; supplied by STEEL, Cleveland, for $5; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

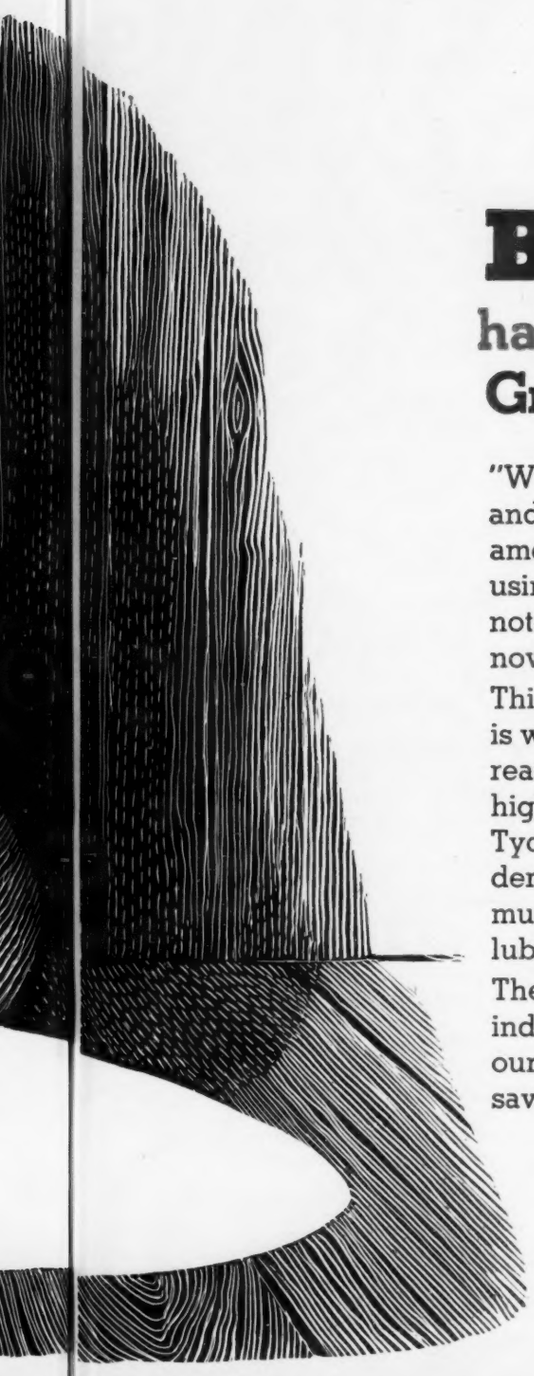
The fourth edition of this well-known work has been revised by the metallurgical staff of Battelle Memorial institute. The present revision treats all steels as related members of the same family and seeks to give a unified picture of steel and its heat treatment from a broad and practical point of view. Volume II deals with engineering and special purpose steels, both carbon and alloy.

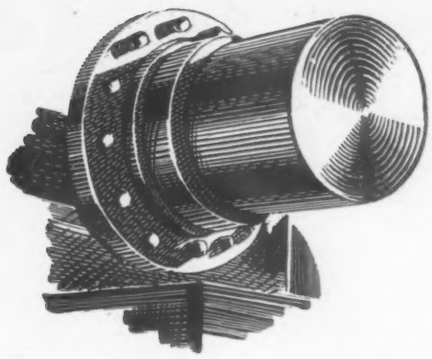
This is the day of steels whose composition and heat treatment are adjusted to fit them for some specialized engineering use which is not adequately served by tonnage steels.

In order that other special steels may be made available as new and different needs arise and that intelligent choice may be made among the compositions of, and treatments for, those now available, the characteristics of the alloying elements, the special properties they confer on steel and the variations in heat treatment required to make the fullest and most economical utilization of the alloy steels have been given special attention. Cast steel has been given equal consideration with wrought steel.

Tables, graphs and charts are plentifully used, a bibliography is appended to each chapter and an index is included.

WASTE
shows up quickly
HERE...
TYCOL
OILS-GREASES
TIDE WATER
THERE IS A COMPLETE LINE OF TYCOL LUBRICANTS





BUT IN BEARINGS

half the grease oozed away until Tycol Green Cast Greases revealed the losses

"We felt that the lubrication job was not being well done. Pressures and temperatures seemed too high for the grease we were using. The amount used, too, was apparently excessive. Since we have been using Tide Water Greases there are differences that are readily noted. We were formerly compelled to pack the bearings twice a day; now we get along with one filling a day."

This plant also enjoys a feeling of confidence that the lubrication job is well done. Maintenance and replacement have been lowered. The reasons are easily understood: Ordinary greases formerly used were high in soap – soap necessary to give "body" to light bodied oils. Tycol Green Cast Greases are compounded of paraffine-base cylinder oils . . . oils that make possible a full-bodied grease with a minimum of soap. The more oil per pound of grease the greater the lubricating value of the grease.

There is a Tycol Grease and Oil scientifically engineered to fit each industrial requirement. Drop us a line. We will be glad to send one of our engineering staff to show you how "engineered lubrication" can save you money and worry.

TIDE WATER ASSOCIATED OIL COMPANY
TIDE WATER DIVISION, 17 BATTERY PLACE
New York, N. Y.

GREEN CAST GREASES
SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

Metal Creep Still Defies Useful Generalizations Based on Theory

■ ALTHOUGH the creep of metals has been studied for a half century and most intensively in recent years, the time has not yet come when definite theories can be propounded or behavior of metals under elevated temperatures can be predicted. This was clearly emphasized in two important lectures on the subject presented at the 150th meeting of the American Institute of Mining and Metallurgical Engineers in New York, Feb. 13-16.

Early sessions of the institute meeting were reported in STEEL for Feb. 20, page 15; features of later sessions are summarized here. In connection with the installation of new officers, announced last week, W. B. Heroy, vice president, Pilgrims Exploration Co., Houston, Tex., and Henry Krumb, consulting mining engineer, New York, assumed posts as institute vice presidents.

In the annual Howe lecture before the Iron and Steel division, Dr. H. W. Gillett, chief technical advisor, Battelle Memorial institute, Columbus, O., discussed "Some Things We Don't Know About the Creep of Metals;" and in the eighteenth annual lecture of the Institute of Metals division Dr. Daniel Hanson, Feeney professor of metallurgy, University of Birmingham, Birmingham, England, spoke on "The Creep of Metals." Both lecturers are eminent authorities in the creep of metals field.

Dr. Gillett pointed out that despite the industrial importance of creep and despite the fact that it has been under investigation for more than 50 years, the subject is too baffling to permit general scientific and useful generalizations.

Recommends "Horse Sense"

Admitting creep is the slow deformation or yielding of metals under stress, Dr. Gillett advised fellow metallurgists not to lean too heavily on theory, but to accumulate additional basic data and apply "plain horse sense" in their use. Creep in some instances puts a period to the usefulness of costly equipment or prevents the application of otherwise suitable materials in important industrial services.

For example, he pointed out that some steam turbine parts although operating at high temperatures and pressures must not expand more than 1/500-inch over a long period, or the equipment must be replaced. There is, however, no short cut or quick method to determine whether any given material will meet such requirements for this or other similar heavy use. Only patient, time-consuming tests made under conditions expected to be employed in their expected use will give data and reliable figures with which to predict service behavior, in Dr. Gillett's opinion.

Prof. Hanson devoted attention to principal phenomena associated with the flow and fracture of metals subject to prolonged loads and the relation between load and life; also the possibility of the existence of a limiting creep stress at elevated temperatures. He stressed the importance of a study of deformation under load, and the characteristics of the creep strain-time curve.

Also discussed by Dr. Hanson were: (1) The minimum creep rate, which is a characteristic feature of flow under constant load, varies with load and temperature, and represents the variable viscosity of the material; and (2) the phenomena of flow which are usually regarded as due to a running balance between strain-hardening and annealing effects.

No Comprehensive Theories

These effects, Dr. Hanson continued, play an important part in determining behavior at elevated temperatures, but insufficient is as yet known of the mechanism of creep to allow comprehensive theories to be evolved. Metallographic methods of studying flow contribute to study of creep.

A notable increase in chromium-bearing steels for specialized requirements has been witnessed in recent years, especially for structural purposes when welding is utilized for fabrication.

Reviewing the use of chromium in structural steels, Walter Crafts, Union Carbide & Carbon Research Laboratories Inc., Niagara Falls, N. Y., said the outstanding property of chromium is its toughening influence, especially in conjunction with a high phosphorous content. This is manifested by added resistance to strain embrittlement in unkilled steel, by increased impact strength in steel of the high-strength structural types, and by improved ductility in welds. Chromium also has a material influence on the atmospheric corrosion resistance of high-phosphorus copper-bearing steel.

From relationships with other alloys it may be concluded that although chromium is essential only in some types, as in high-phosphorus steels, it is eminently desirable and advantageous in almost all combinations of alloys, according to Mr. Crafts.

Chromium is so widely know for its carbide-forming tendency that its capacity to stabilize oxygen, nitrogen, and phosphorus is sometimes overlooked. In low-carbon steels of the structural type these so-called secondary characteristics become more prominent. For this reason also, chromium in structural steel is definitely a toughening agent. As the carbon content is increased, the more widely known hardening effect of chromium on an alloy becomes more evident.

Although chromium structural steels in the 75,000-pound tensile strength range have been made with more than 0.13 per cent carbon, such steels generally are not capable of being welded safely without a subsequent stress-relieving anneal. Chromium is not usually employed in these higher carbon steels, and the discussion was restricted to steels containing about 0.10 per cent carbon.

It is evident, says Mr. Crafts, that in well-balanced steels in the 75,000-pound per square inch tensile strength range, chromium adds to the toughness and has little influence on the yield point or tensile strength. When the carbon, alloy, or chromium content is high enough for chromium to increase the strength appreciably, the toughening influence becomes less strong. The optimum chromium content therefore depends on the degree of toughening that is required.

Steels having a higher tensile strength than about 80,000-pound per square inch are generally stress-relieved after welding, so that, aside from special purpose steels, the principal metallurgical requirement is a high order of toughness in the base metal. The higher strength also implies more difficulty in production and fabrication, and in order to take advantage of the higher strength the surface must be practically perfect, especially if repetitive loading is involved.

Reduces Brittleness

The property of chromium in reducing segregation and ingotism, as indicated by reduction of brittleness and improvement of welds, becomes of more obvious advantage in these harder steels, according to Mr. Crafts. Likewise, the decarburization at the surface is reduced by the oxidizable alloys like chromium, manganese and silicon. While the presence of these alloys will not guarantee a high fatigue life of structures having oxidized surfaces, they at least facilitate the development of a more favorable surface condition. More obvious surface de-

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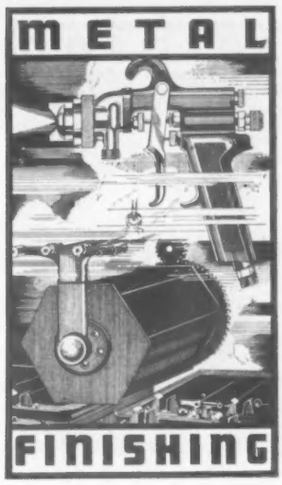


Lithographed Sheets

New high-speed printing presses effectively apply complicated designs and trademarks to metal sheets. Finished surfaces withstand subsequent forming and fabricating operations without damage

■ A DEVELOPMENT of comparatively recent times is the increased use of color and individual trademarks on oil drums and various containers used by the petroleum industry. At the present time oil drum heads, for instance, are being lithographed in brilliant colors and attractive designs to enable this space to be utilized most effectively as an advertising medium while containers are in transit and in use.

Lithographing on metal has been developed to the point where designs which formerly could be reproduced only on paper can now be applied directly on metal even though intricate and vari-colored trademarks as well as fine printing are involved. Such work, of course, is done on the flat metal sheets prior to fabrication of the container. An outstanding installation of such high-speed lithographing equipment has just been completed at the plant of Petroleum Iron Works, Sharon, Pa.

Shown in the accompanying illustration, the equipment consists of a high-speed lithographing press, a roller coating machine and a baking oven, all set in line for continuous production. Made by Rutherford Machinery Co., New York, the lithographing press in the immediate foreground at the right handles sheet up to 18-gage as large as 30 x 48 inches.

The coating machine is in line between the lithographing machine and the oven.

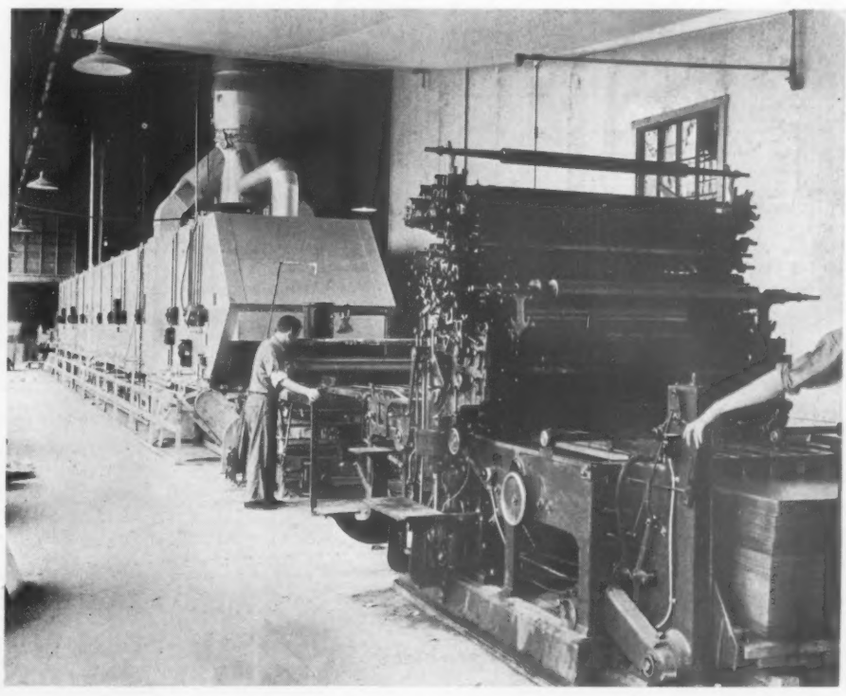
The oven is 116 feet long and employs automatic temperature control and recording instruments. It was furnished by Young Bros. Co., Detroit, and contains a mechanism synchronized with the press and coating machine which automatically loads the individual sheets in wire supporting racks where they are carried through the furnace. Entire processing line is approximately 140 feet long from point where sheets are loaded into lithographing press to unloading end of oven where finished sheets are stacked ready for subsequent forming and fabricating processes.

In operation, the sheet is first given a base coat of enamel paint by passing it through the roller coating machine only. This feeds automatically into the oven where the coat is baked on at a temperature between 250 and 300 degrees Fahr. Speed of travel through oven is such that work is subjected to these temperatures for about 20 minutes.

Next step is the printing of the design, trademark, lettering, etc. which is handled in the lithographing press. This work may involve any number of color coats using different colors, one color being applied at a time and sent through the baking oven for drying. Usually three or four color coats are involved in reproducing the desired pattern. For this work synthetic inks are employed.

After color coats have been applied to furnish the desired design, a varnish coat is put on. Each of

(*Please turn to Page* 83)



Lithographing press, coating machine and baking oven form 140-foot processing line for steel sheets at Petroleum Iron Works, Sharon, Pa.

Pleasure Cruisers

Former difficulties are here overcome by combining ship construction principles with essentials of successful arc welding. Steel hulls prove to be lighter, stronger, tighter, fireproof, and withstand freezing-in during winter

By **MILO BAILEY**
President &
Chief Engineer
Bailey Steel Shipbuilding Co.
Detroit

■ IT HAS LONG been considered by naval architects and builders of pleasure craft that a steel hull under 50 feet could not equal the speed or have a strength comparable to a hull of wood.

However, it is generally conceded by builders, as well as the majority of cruiser owners, that if the weight-cost problem could be solved and brought down to a competitive basis with wood, a great demand would develop for steel craft because of their greater strength, safety, and low cost of maintenance.

An analysis of the stiffness and torsional resistance of hulls, wood or steel would be too involved and lengthy, but a comparison of tensile strength may easily be made and understood from the illustrations in Fig. 1. Here A is a 40-foot wooden cruiser, currently produced by a recognized builder of a high class product having staunch construction.

B is a 40-foot, modern, steel, arc welded cruiser having ⅛-inch thickness of shell plating with plates full width from sheer to chine and chine to keel. The lengths vary from 12 feet down to 3 feet with only one welded joint at the chine. This joint being stronger than the plating, the hull side is considered seamless. The arc welded steel hull, B, is actually lighter than wood, has greater speed because it is lighter—and is over 90 per cent stronger.

Fundamental requirements for successful fabrication of arc welded steel craft include:

First: It is necessary that the builder of arc welded steel have a thorough knowledge of wooden cruiser construction as well as the intricacies of handling, forming and welding steel and that he be free from any prejudice for wood.

Second: He must be able to visualize the strength of a steel hull after it is welded, and carefully select the sizes of angles, channels and bars going into the construction, accordingly. His temptation will be to "go heavy" in this selection at the outset, resulting in a heavier-than-necessary hull (this is also a general failing of naval architects in designing for arc welded construction).

Third: The fabrication of all structures must be exact—closer than those of wood—because the builder cannot remove stock to

This is an abstract from the paper which received the first award, $712.28, in the Pleasure Craft division of the Motor Craft classification of the $200,000 Award Program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland.

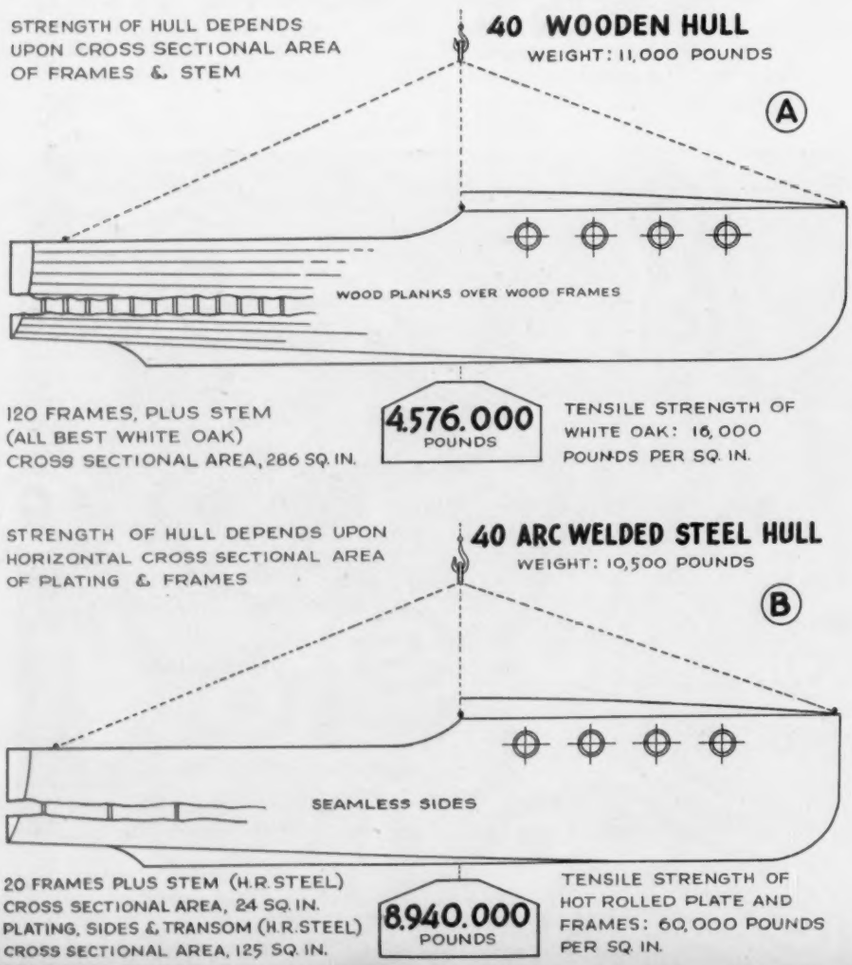

STRENGTH OF HULL DEPENDS UPON CROSS SECTIONAL AREA OF FRAMES & STEM
40 WOODEN HULL
WEIGHT: 11,000 POUNDS
A
WOOD PLANKS OVER WOOD FRAMES
120 FRAMES, PLUS STEM (ALL BEST WHITE OAK) CROSS SECTIONAL AREA, 286 SQ. IN.
4,576,000 POUNDS
TENSILE STRENGTH OF WHITE OAK: 16,000 POUNDS PER SQ. IN.
STRENGTH OF HULL DEPENDS UPON HORIZONTAL CROSS SECTIONAL AREA OF PLATING & FRAMES
40 ARC WELDED STEEL HULL
WEIGHT: 10,500 POUNDS
B
SEAMLESS SIDES
20 FRAMES PLUS STEM (H.R. STEEL) CROSS SECTIONAL AREA, 24 SQ. IN.
PLATING, SIDES & TRANSOM (H.R. STEEL) CROSS SECTIONAL AREA, 125 SQ. IN.
8,940,000 POUNDS
TENSILE STRENGTH OF HOT ROLLED PLATE AND FRAMES: 60,000 POUNDS PER SQ. IN.

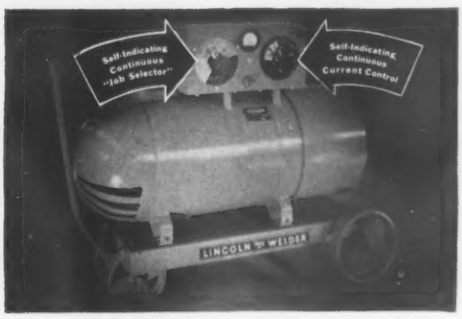
Fig. 1—An analysis of the stiffness and torsional resistance of hulls

PLUGGING FOR PROGRESS WITH POP AND LAD

BIG GAME THAT'S ALWAYS IN SEASON

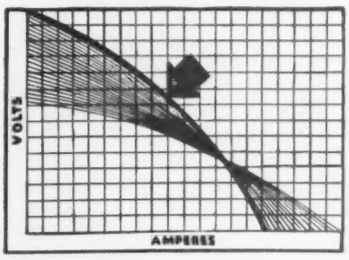
How to bag it with the *New "Shield-Arc"*

TYPICAL HUNTING GROUND
Flat, downhand welding of machine bases with 3/8-inch electrode.

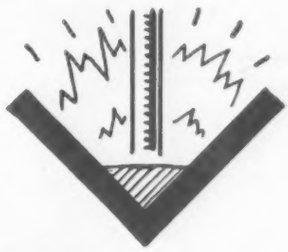


THE WEAPON. New *"Shield-Arc"* with Self-Indicating "Job Selector" and Current Control.

READY. Self-Indicating "Job Selector" sets "sights" of *"Shield-Arc"* Welder for accurately aimed volt-ampere curve.



AIM. At this setting, volt-ampere curve has steep slope. Hence, changes in arc length have little effect on welding current, assuring steady arc heat at high deposit rates.



FIRE! Molten metal flows at maximum speed and with minimum spatter because arc is high-powered, yet steady. Result: Lowest cost-per-pound-deposited is *in the bag.*

"I know a user of this new Lincoln who was able to boost his electrode calibre from 5/16" to 3/8" and . . . wham! . . . cost-per-pound-deposited dropped from 75c to 55c. At 5 lbs. per hour, that's a buck bagged every hour throughout a perpetual season!"

"Right, Pop. This 'Shield-Arc' is the answer to many profit-hunters' prayers because it provides *any* TYPE of arc and *any* AMPERAGE—each one labeled. Your hunting domain is bigger and richer. Shoot the coupon for your free guide."

Largest Manufacturers of Arc Welding Equipment in the World

THE LINCOLN ELECTRIC COMPANY

CLEVELAND, OHIO

THE LINCOLN ELECTRIC CO., Dept. Y-567, Cleveland, O.
Send free copy of Bulletin 412-A.

Name _____ Position _____

Company _____

Address _____

City _____ State _____

"fair" up a contour or "sweep," except by grinding and at great cost.

Fourth: A solid, accurate jig must be constructed to hold all framework rigidly and in perfect alignment throughout the entire construction of the hull, from laying the keel to completion of the final operation of shell plating sides and bottom.

Fifth: Inaccuracies must be corrected as construction progresses, otherwise their multiplication develops into either a major problem of costly correction or poor appearance when finally finished.

Sixth: The entire procedure must be carefully analyzed, a progressive operation chart, such as Fig. 2, developed for sequence of operations, and then rigidly followed.

Seventh: Select a design of hull preferably developed for arc welded construction.

Production methods described here were developed after several hulls were constructed and thoroughly tested, using different well-known principles of hull framing from which the one best suited for arc welded fabrication was chosen for production. A modified Isherwood system of longitudinal support for the shell plating provided the greatest hull strength and lightness and aided fabrication materially.

Close adherence to correct sequence of operations is absolutely necessary because it involves not only minimum of "labor" motion but is in accordance with the welding procedure learned from hard, expensive experience. It was found in many cases that operations and sequences had to be reversed to overcome distortion of plates or frames from heat of welding.

Operation sequence of the subassemblies such as keel, stem and main frames do not appear in the chart as these parts are fabricated outside on contract and delivered to the line in completed units.

The most exacting and accurate operations, those which control the varying degrees of perfection of the completed hull, are tied up in operations 1 to 11. Once safely past operation 11, only lax supervision, poor workmanship and bad welding can ruin the successful completion of a faultlessly fabricated hull.

Adequate Jig Essential

Without the aid of an adequate jig it is almost impossible to produce an arc welded steel cruiser that will pass the sharp inspection of a critical public. The jig consists of two heavy 6 x 8-inch timbers (skids) which form the base. These must be set perfectly level across, lengthwise and parallel. Upon the top surfaces are bolted the base beams, heavy steel channels. The aft faces of these must be spaced exactly the same as the hull frames—all must be perpendicular to the skids.

The "stocks" are now located on a centerline scribed across the tops of the base beams from end to end and bolted to the aft faces. Tops are notched to receive the keel and to prevent lateral misalignment. Small angles are clamped to the faces and side of keel to hold keel in a vertical position until frames are welded in place.

A tie bar of angle iron is welded to the sides of the stocks for reinforcement from end to end. The lower frame supports are bolted near the ends of the base beams and are adjustable to any radial position when bolt is slacked. Upper frame supports are supported by six heavy vertical angles, the bases of which are welded to base beam extensions bolted to base beams. After operation No. 10, this whole upper structure is unbolted at the base beams and removed to the next jig to start another hull.

Aft faces of upper frame supports are in perfect vertical and athwartship alignment with lower frame supports and stocks. Thus, when the hull frames are placed in position and forward faces clamped to supports, they are in perfect alignment all ways—square and plumb. Accuracy of entire jig is held to a plus or minus limit of 3/64-inch, easily accomplished when the structure is welded. Accompanying illustrations clearly show entire jig construction and progressive assembly of the hull. A glance through the "sequence of operations" chart will amplify the procedure.

As the work progresses and the hull increases in weight, the base beams are checked frequently for levelness. This is to assure against twist of jig in case the footing under the skids settles during construction. If the skids are laid on a concrete base this will not occur.

Detailed construction of an "aft" main frame follows. This assembly is made up of two side and bottom members, rolled to a predetermined arc, cut to template and welded together in a flat steel jig. The points at deck plate, chine and keel are located to exact position by stops on the jig and heavily clamped with thin copper strips under the mitred joints and joint at keel. This copper plate prevents welding the frame joints to the jig, also it dissipates heat quickly.

To facilitate welding speed, these joints are welded only on one side with the welding mostly down-hand and at a convenient position for the operator. After welding is completed and floor beams are welded in place, the frame is left to cool completely before removing from jig, allowing the stresses to equalize, eliminating distortion.

The next operation is mechanical —the notching out for longitudinals,

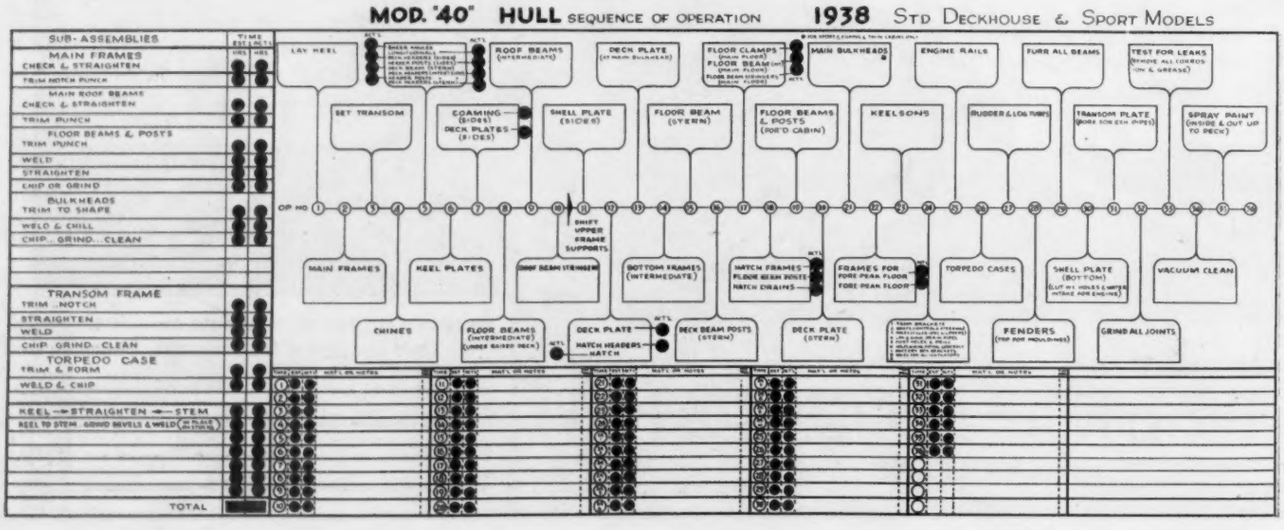


Fig. 2—Progressive operation chart developed to show sequence of operations, a most important element in this work

chines, keel, and keel plates—all done on a punch press and accomplished in a few minutes.

Frame is now placed back on the welding jig to further check for distortion. Passing inspection, it is ready to be set in position on keel and clamped to the fabricating jig upper and lower frame supports. From this point the sequence of operations is followed.

Shell plating has been the stumbling block to successful construction of all light-weight welded craft. Analysis of failures indicates the following reasons: Steel sheets having hard and soft areas, locked-up rolling stresses and waves; forcing sheets to conform to frame curves, thus setting up stresses which are released by welding heat into uneven "breaks" and irregular surfaces; weak framing, poorly supported; frames or longitudinals not "fair" ("fair" is the evenness of continuous curves from bow to stern, or sheer to keel at any section of the hull surface); poorly controlled welding heat, wrong size and quality of electrode used; excessive welding speed and inadequate time allowance for cooling; lack on operator's part of good welding sense and good judgment of heat adjustment; and inadequate means of holding plating to frames during welding operation.

Successful Procedure

Assuming all the adverse conditions above have been overcome, the procedure for successful shell plating is illustrated and described as follows:

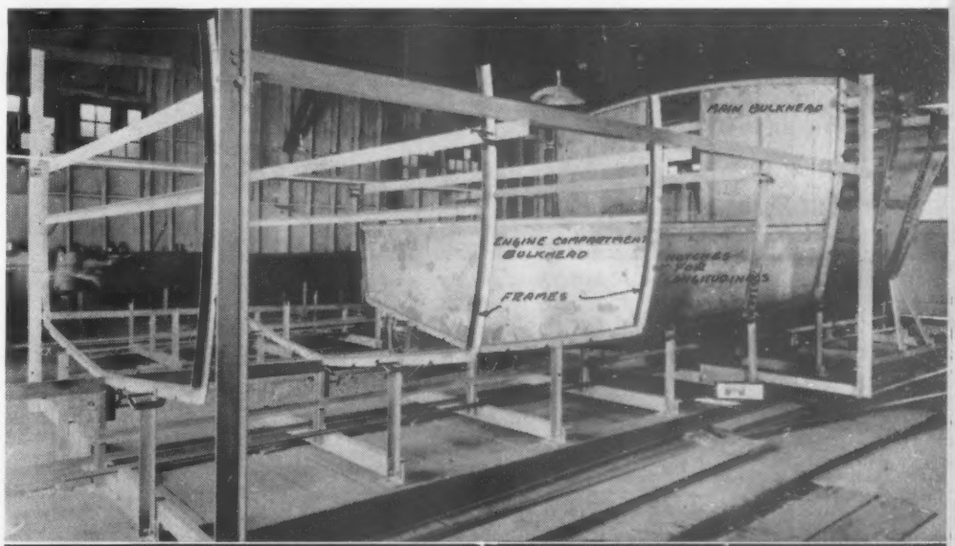
First operation is to make templates of light wooden strips nailed and glued together, the outside edges of which are even with the deck plate line, forward and after edge of plate (whatever length decided upon,) and the chine corner, or lower edge. This gives the developed shape of the plate. When the blank sheet is flattened out on it, the edges become the line to which the sheet is trimmed. This trimming is done by a new type of portable electric shear which trims ⅛-inch thick metal to any contour at the rate of 6 feet per minute.

All plates now are rolled to the approximate curve of the frames they cover. Preliminary rolling, no matter how slight, is necessary to smooth plating, because the stresses then have assumed the characteristic of the frame curve and remain stationary with no tendency to "release" in other direction when heat of welding extends its area and upsets the molecular structure of the steel.

The plates are now "hung" from the tops at the deck plate edge by C-clamps. Then shaped "strong backs" (angles bent to a slightly greater radius than the frame contour) are clamped over the plating and also held at tops by C-clamps. The strong backs, spaced about a foot apart, are brought down tightly over the plates to bring plates tightly into contact with the frames and longitudinals, and then they are clamped to the chine.

By handling plates from tops and "ironing out" toward the chines, advantage is taken of gravity to hold the plate close (plates weigh from 200 to 350 pounds each) and to overcome friction from plates creeping on frames or longitudinals.

The advantages of such a steel hull may be summed up as follows: All welded steel hull and superstructure—no leaks; maintenance cost is one-fourth that of wood; cabin sides cannot crack or open up; hull can be frozen in without harm; complete insulation against heat, noise and vibration; cooler in the tropics; immune to marine borers (Teredo); quieter and smoother; dusty-dry, odorless bilges; no wet rot or dry rot—no calking; built for use in any waters; engines in stern, enclosed in fireproof steel compartment.



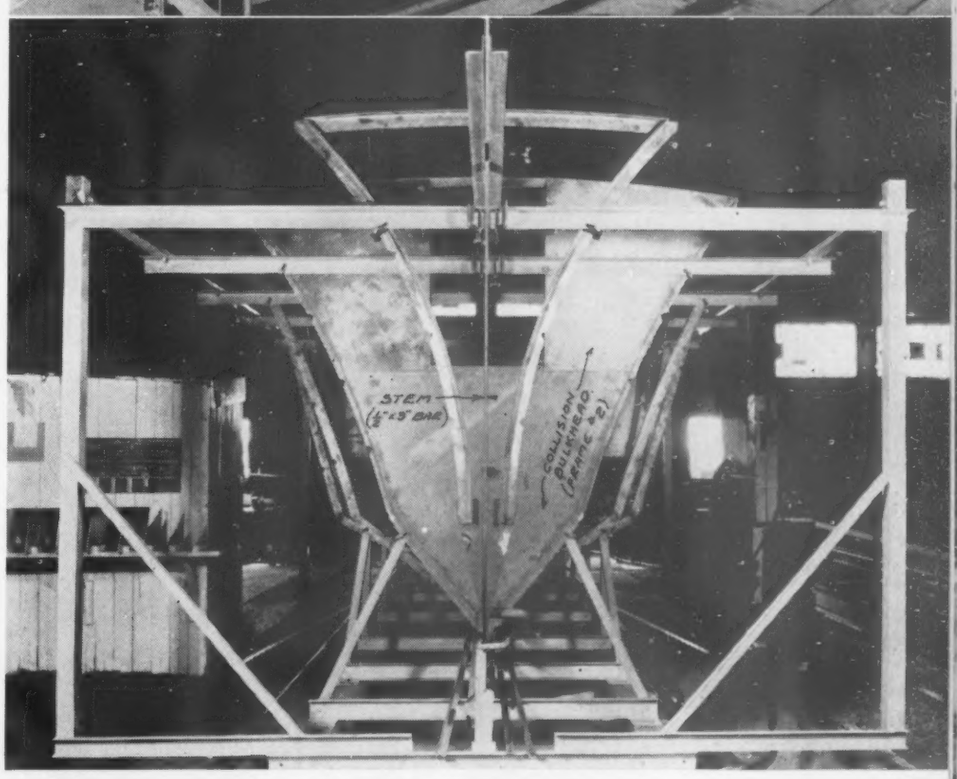
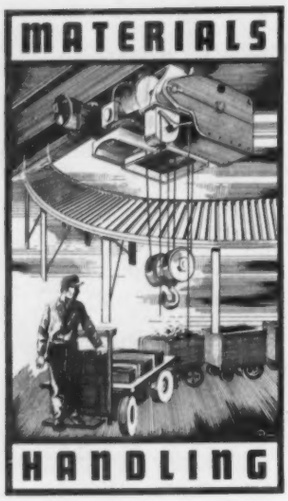
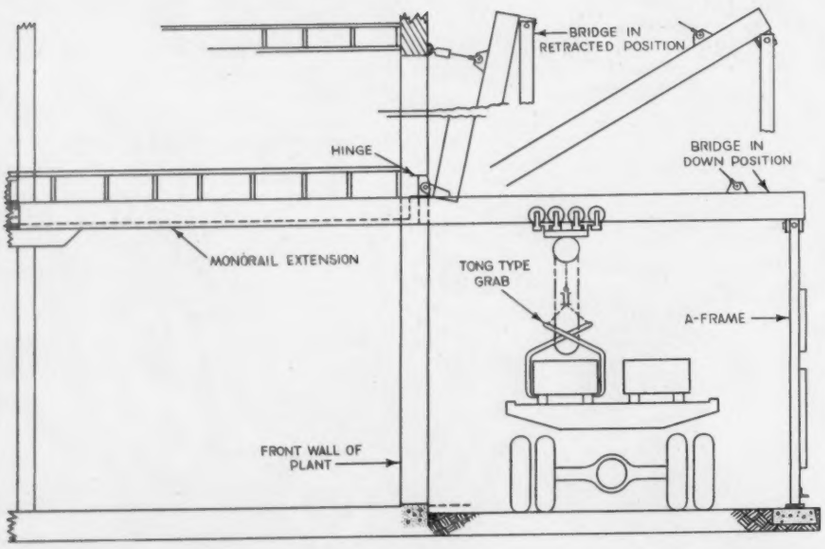


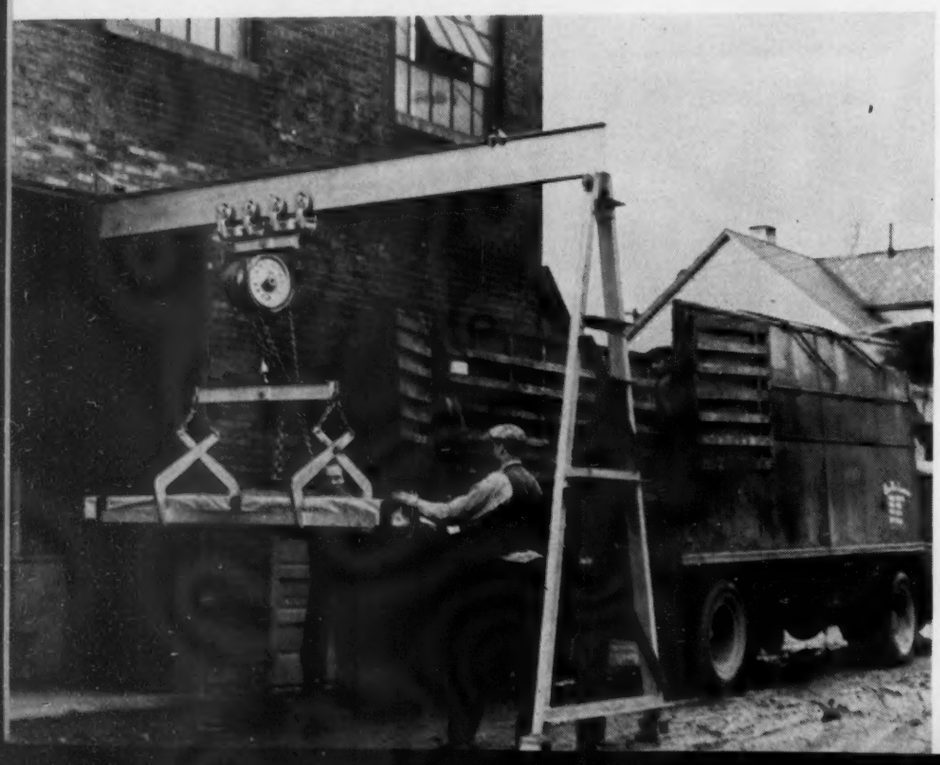
Fig. 3. (Upper)—Quartering view of jig showing aft frames, main and engine compartments and bulkheads in place. Fig. 4. (Lower)—Bow view of jig showing how frames are clamped in place to upper and lower frame supports



Retractible Crane

Bundles of steel sheets are quickly unloaded from trucks and transferred directly to temporary storage in line with fabricating machinery by a simple crane and connecting monorail extension. Significant savings have been effected





■ ALTHOUGH no great tonnage of sheet steel is required for the fabrication of special size filing cabinets at the plant of Steel Storage File Co., 2216 West Sixty-third street, Cleveland, this company reports a savings of $150 in handling costs during the four months since it installed a retractible monorail crane for unloading bundles of sheets from trucks.

Handles Bundles of Sheets

Steel used at the plant is 24-gage and is received in wrapped and bound 2½-ton bundles. Formerly, these bundles were broken and sheets were passed manually two or three at a time from the truck through a special door to floor trucks inside the building. Unloading of the steel from floor trucks in storage and delivery of sheets to fabricating machines followed the same laborious method, sheet by sheet. Damage to steel during these various movements amounted to a considerable item, so it was decided that some mechanical and more direct system would have to be adopted.

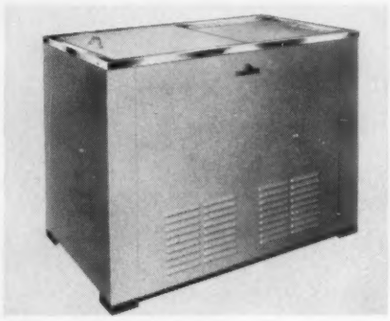
But at this point a puzzling problem had to be faced. The plant building extends to the very edge of the street. There is no private driveway, and trucks cannot enter the plant. A city ordinance prohibits the erection of a permanent crane superstructure or unloading device over the public thoroughfare.

(*Please turn to Page* 84)

(Above) Diagram of installation, showing crane in operating position and loaded truck spotted beneath the bridge. (Below) It requires only a few movements to transfer bundles of steel from truck along the monorail extension to storage at fabricating machines. Photograph courtesy American Monorail Co.

NEW METAL PRODUCTS

■ An attractive combination of enamel and stainless steel adds greatly to the beauty of this new

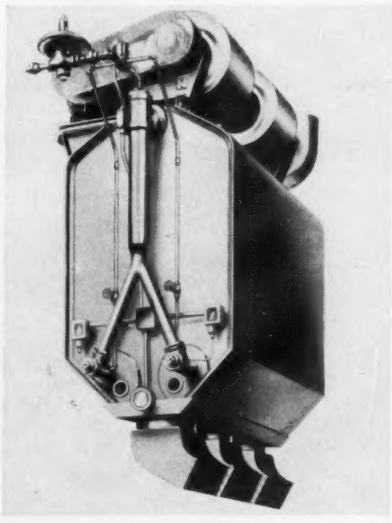


Duo-Cold bottled beverage cooler, designed by Westinghouse Electric & Mfg. Co., East Pittsburgh, for use in refreshment stands, drug stores, restaurants and clubs where space savings and convenience are desirable.

This hermetically sealed unit is self-contained and is ready to plug in and operate. Its exterior is gleaming porcelain enamel on a base of Armco enameling iron. Stainless steel is used for trim and top rail. Interior is galvanized Armco ingot iron. Cooler may be obtained in lengths ranging from 45 to 72 inches.

■ Rooms of large floor area and high ceilings may be heated effectively by a new high capacity, suspended type unit heater developed by Dravo Corp., Pittsburgh. This unit will operate on natural gas, manufactured gas or coke oven gas. It is 3 feet wide, 5 feet long and 7 feet high, weighs 3000 pounds and is welded steel throughout.

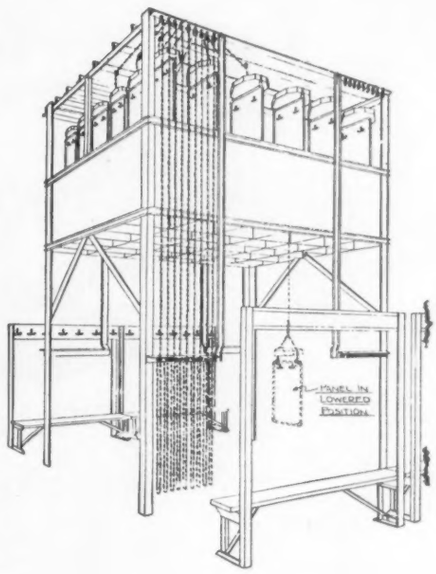
Output capacity of this heater is



500,000 B.t.u. per hour and air discharge is at a rate of 5500 cubic feet per minute with an average temperature rise of 110 degrees Fahr. Air velocity at heater outlets is 2000 feet per minute, and two blower type fans are used to spread the air.

■ The problem of providing a satisfactory system of storing workmen's clothing between shifts has been met by a new locker system, designed by Lyon Metal Products Inc., Aurora, Ill. In this method storage is provided high above the working floor near the roof where air is warmer, dryer and fresher, allowing perspiration to dry out of the clothing.

System consists of a superstructure of steel that supports locker



cubicles. Combination clothes pan and panels are suspended from the top with chains and pulls to permit raising and lowering. Padlocking of chains to superstructure assures safety. Each individual locker unit may serve two persons. Superstructure is bolted together and is braced to assure rigidity. All steel parts are finished in baked green enamel. Single-faced units consist of three rows of six lockers each and double-faced units have six rows of six lockers each.

■ To check erosion of highway fills and embankments and to control drainage during road construction, Central Culvert Co., Ottumwa, Iowa, has devised a system of ditch checks, each unit being made of 16-gage iron-copper alloy corrugated sheets. Standard 11-pound units are formed under great pressure. Drain is 2 inches high; apron measures 8 inches wide; anchor is 10 inches deep; and unit is 25½ inches wide overall. Each check is heavily coated with zinc spelter to increase

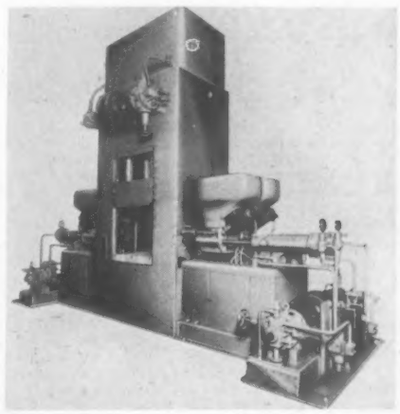
its life and add extra resistance to corrosion and abrasion.

Installation is said to be simple, a maul being the only tool needed. Checks are driven into the ground to the anchor plate in the ditch bed, with as many additional units flanking the center unit as may be required to complete the dam, each unit overlapping that adjoining it one corrugation.

■ An injection molding press with a capacity of 32 ounces per shot has been developed by Hydraulic Press Mfg. Co., Mt. Gilead, O. Known as Model 500, this press is the vertical, downward acting, mold clamp type, with two 8-ounce injection units mounted on each side.

Power unit for operating the clamp is mounted overhead on back of the frame, and surge tank containing the operating oil also is overhead. Separate power units for each injection unit are mounted just back of the injection cylinder supports. A hydraulic ejector is built into base of the clamp.

The first job produced on this press was a glove compartment door and instrument panel for a 1939 automobile. This part consists of a metal stamping base over which a Tenite plastic coating is formed.



Is there a Skeptic

We Quote These Facts

1. "Using U·S·S Controlled Steels, these tin snips have been easier to forge. In addition, the drilling operation has been more satisfactory, and heat treatment has been more uniform. Better tapping, grinding and polishing practice has been possible."

2. "U·S·S Controlled Steels have increased the physical properties of our formed and heat treated chain by at least 25%. We find the steel for our requirements is now at a very high standard of quality and of dependable uniformity."

3. "Since using U·S·S Controlled Steels there has been far more uniformity in all the processing operations, and many troubles have been eliminated. Better cutting of teeth, and hardening with less breakage and warpage are characteristics of the use of U·S·S Controlled Steels."

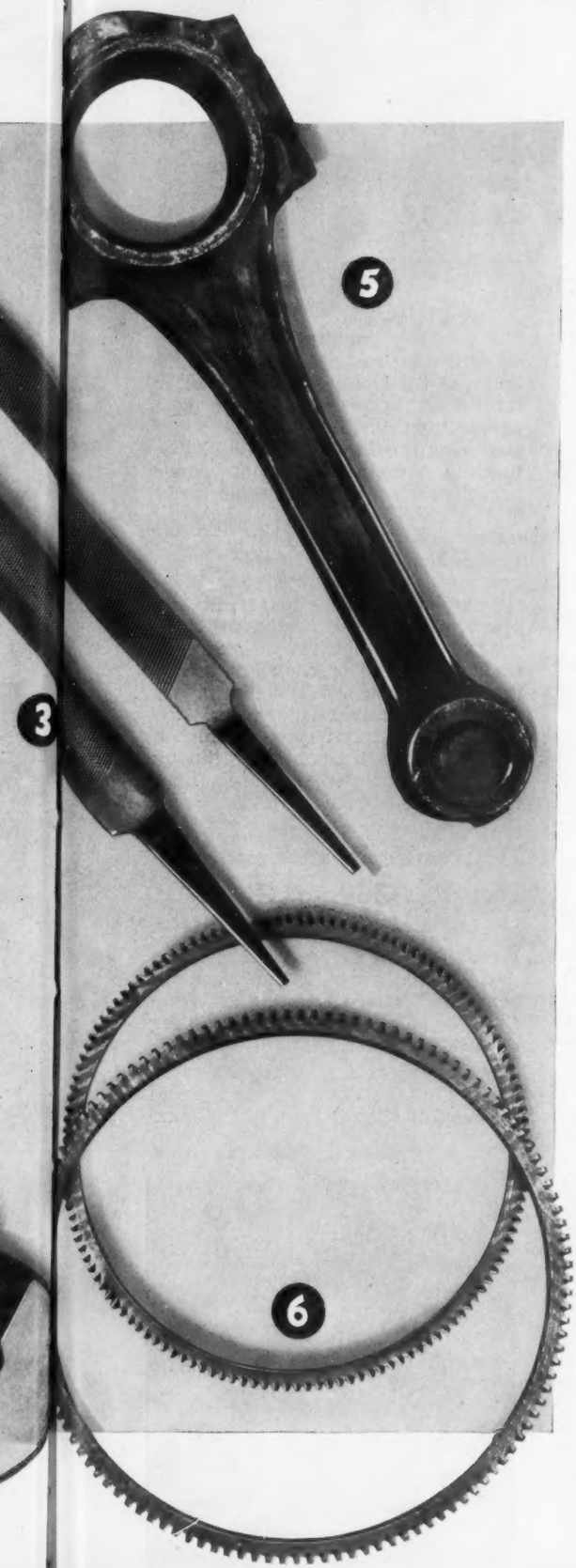
4. "In making Stillson wrenches performance has proved U·S·S Controlled Steels far superior for uniformity—has given these wrenches the ability to meet practically double the strength requirements. Made of U·S·S Controlled Steels, side cutting pliers have shown greater strength and longer life. Response to case carburizing and heat treatment has been excellent."

5. "U·S·S Controlled Steels, used for connecting rods, have proved advantageous in many ways. Ease of forging, uniformity in heat treatment and well-filled sections are characteristic. Also, freedom from trimmer cracks and quench cracks was noticeable, as well as marked toughness after heat treatment."

6. "With U·S·S Controlled Steels reruns on ring gears have been considerably reduced, the majority now being rerun for size only. Satisfactory performance has been noted with both fine and coarse grain steel, grade selected according to definite requirements."

UNITED S

e in the House ?



WHEN we first announced Controlled Steels the Doubting Thomases had a field day. When we said that we could produce carbon steels in which *all* quality factors could be predetermined, in which variables could be scientifically eliminated they were definitely from Missouri.

Now, only a few years later, many of them are among the largest users of U·S·S Controlled Steels. The drastic savings made in plants all over the country, due to better machining—reduced heat-treatment costs—easier forging and forming — and more consistent and uniform production generally have proved the case for U·S·S Controlled Steels.

Today in shops whose combined cost reductions run into hundreds of thousands of dollars yearly, they swear by these superior carbon steels.

In U·S·S Controlled Steels, control goes further than the mere close adherence to chemical specifications. It has to do with control of other vitally important properties—forging and machining qualities, response to heat-treatment, ductility, etc.—which so largely determine whether production in the steel user's plant will be wasteful or economical.

In U·S·S Controlled Steels we have proved it quite possible to furnish not only fine grain or coarse grain steel as required, but to maintain uniformity in shipment after shipment. Thus tool set-ups, heat-treating and forging procedures, once established for the steel, require minimum change. Reduced costs and better results follow as a matter of course.

Why not invite one of our metallurgists to look over your production line? If Controlled Steels will save you money he will show you how and where to use them to best advantage. It costs nothing to have him call.

Controlled Steels

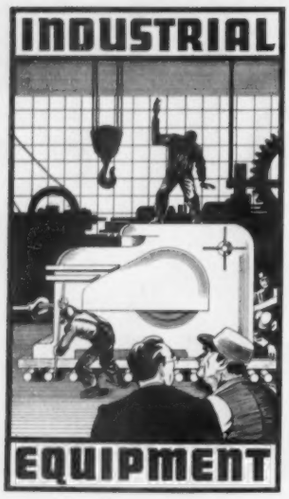
USS

CARNEGIE-ILLINOIS STEEL CORPORATION

Pittsburgh and Chicago

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Products Company, New York, *Export Distributors*

STATES STEEL

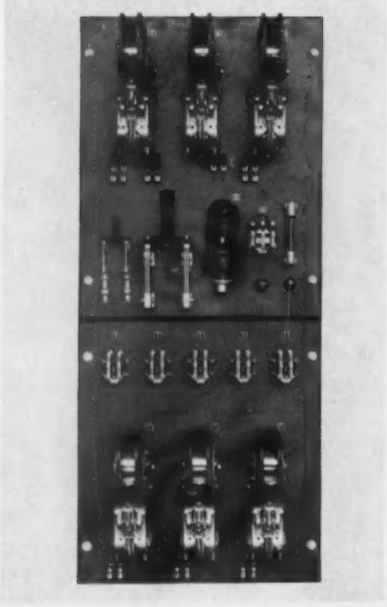


Automatically Controls Acceleration of Motors

■ Electric Controller & Mfg. Co., 2700 East Seventy-ninth street, Cleveland, has introduced a complete line of starters and controllers for automatically controlling acceleration of either alternating or direct current motors.

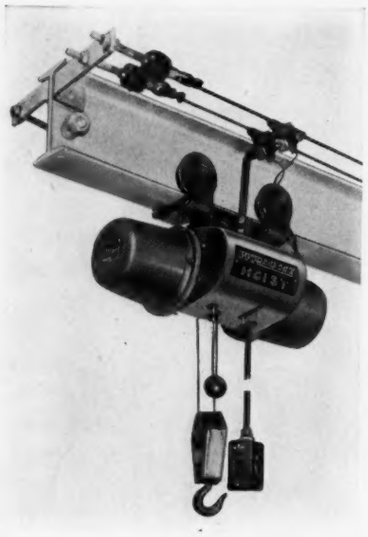
This equipment employs the Neo-Time principle, which is based on the time required to charge a condenser to a predetermined voltage. When this voltage is reached, the condenser discharges through a neon tube to cause the first acceleration contactor to close, after which timing circuit is re-energized to close next accelerating contactor and so on until motor is operating on full line voltage. An adjustable resistor is placed in the condenser-charging circuit to permit a convenient means of varying the time.

An important application for this type of control is in connection with drives requiring long time for acceleration, such as those of fans, saws, shears with flywheels, etc. Starter illustrated is for this type of drive and permits a range of from 3 seconds per acceleration step up to over 30 seconds maximum per step simply by turning the adjusting dial.



Hoist Is Equipped with Anti-Friction Bearings

■ Wright Mfg. division, American Chain Co., Bridgeport, Conn., has placed on the market a lightweight, wire rope electric hoist, called the Speedway, in models with capacities ranging from 250 to 750 pounds and hoisting speeds from 15 to 43 feet per minute.

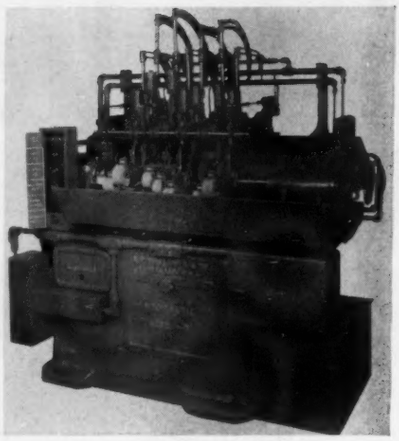


Standard construction includes fully enclosed ball-bearing motor, anti-friction bearings, cut alloy steel spur gears, multiple disk solenoid brake, pushbutton control, preformed hoisting cable, etc. Hoist is made in three types for lug suspension, hook suspension or mounted on trolley.

Crankshaft Lapping Unit Employs Paper Abrasive

■ A. P. Schraner & Co., 3338 Payne avenue, Cleveland, have developed a crankshaft lapping machine, designated as Model B, which laps all main and throw bearings simultaneously and can be adapted to include sidewalls of thrust bearings and oil slinger grooves. A battery of nine of these units has just been furnished the Ford Motor Co.

Operation of the Model B lapper is entirely hydraulic, with pushbutton control, making possible increased speeds of rotation and oscillation of the work, as well as better control of the pressure of abrasive against work. Instead of using stones as the lapping medium, this machine employs rolls of paper abrasive, which is fed automatically and is held against the work by metal shoes. Average amount of paper required for lapping each bearing is about 1½ inches. This arrangement is said to permit lapping of each crankshaft under exactly the same conditions and assure finishing of each bearing to the extreme ends. Production varies from 45 to 60 shafts per hour.

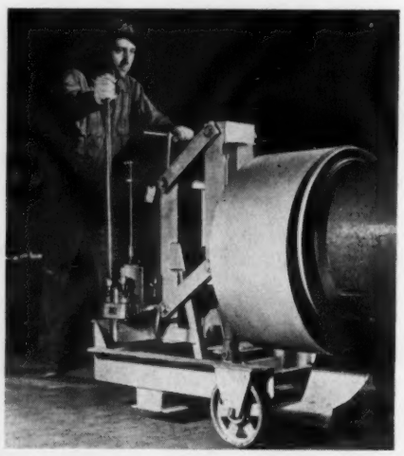


These machines are furnished with paper attachments, although stone holders, which are interchangeable, can be supplied.

Hydraulic Ram Truck Handles Coils of Steel

■ Economy Engineering Co., 2635 West Van Buren street, Chicago, has developed a hydraulic ram truck for removing coils of sheet steel from the take-off reel on a slitter, coiling or pickling machine.

By means of a manually operated hydraulic pump unit the empty ram is raised to the top level of the man-

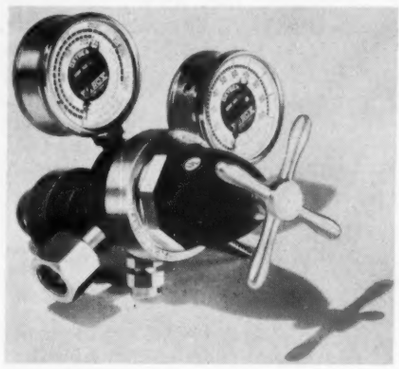


dril, and the coil is pushed off the reel onto the ram. Operator then pulls the truck away to coil storage area and lowers the ram by opening a release valve. Coil comes down to the floor level, resting between the base arms on the truck.

Ram is hinged to a fixed upright, and hydraulic cylinder is mounted directly under the ram and is pivoted to lift freely. Pump unit allows a 14-inch ram travel to be accomplished in 20 strokes. These trucks are arc welded throughout. They are available in capacities ranging from 500 to 10,000 pounds, with ram travel up to 3 feet.

Adds Regulators for Oxygen and Acetylene

■ The Linde Air Products Co., 205 East Forty-second street, New York, has announced three new two-stage regulators: Type R-201 oxygen regulator for ordinary welding and light

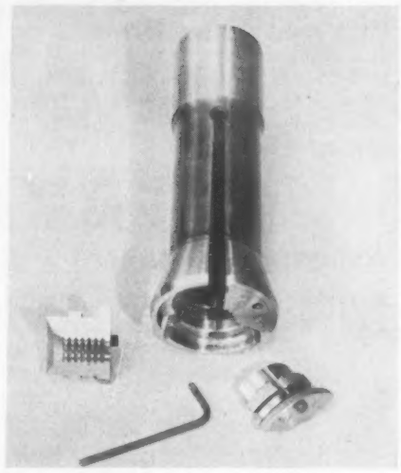


cutting; Type R-202 oxygen regulator for heavy duty cutting; and Type R-203 acetylene regulator. Type R-201 is illustrated.

A fixed "first stage" reduces the pressure of oxygen or acetylene from cylinder pressure to a moderate figure, below which it is regulated by the variable second stage of regulation. Stem type valve mechanisms insure a uniform flow at lower pressures. Monel valve stems are distinct from the diaphragms, thus eliminating possibility of stem distortion due to diaphragm pull caused by leakage. Machined guides assure correct alignment of stems, and heavy valve closing springs give positive seating action.

Collet Design Permits Quick Changing of Pads

■ National Acme Co., 170 East 130th street, Cleveland, has announced a new line of QC master collets with quick change pads that take stock sizes up to maximum spindle capacities of all Acme-Gridley multiple spindle automatic bar



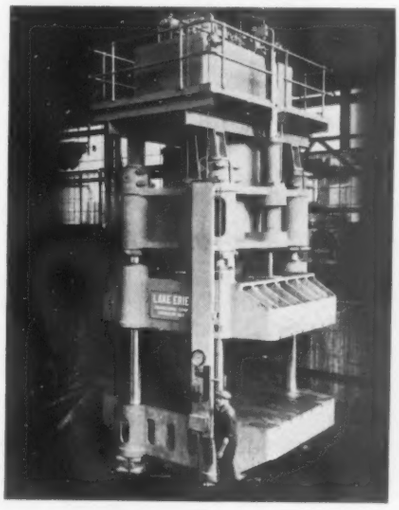
machines that use draw-in type collets.

Screws that hold pads are located in the face of the pads. Operator has only to loosen screws with a small hex socket wrench, and the pad can be lifted out quickly. When pad screw is tightened, the dovetailed shoulder on the pad tongue is drawn downward into its groove in the collet. This design positively seats each pad, maintaining a bearing along the full radius of its collet section. It also promotes smooth and accurate feeding and rigid chucking.

These collets and pads are made from selected steel, machined with toolroom precision, heat-treated, hardened and tested for strength and uniformity.

Huge Press Designed For Aircraft Stamping

■ Lake Erie Engineering Corp., 500 Woodward avenue, Buffalo, recently shipped to the French air ministry the 2500-ton hydraulic press shown in the accompanying illustration. This was one of 14 units ordered by the French government for use in forming duralumin sections of airplane wings, pontoons and fuselage parts.



This press weighs 392,000 pounds and required six freight cars for transportation to the seaboard. Its ram measures 42 inches in diameter, and platens are 150 x 89 inches. Entire press is self-contained with electrically driven pumps mounted on its upper deck. By providing accurately controlled working pressures, this type of unit is said to reduce die costs through the use of dies made of wood, cast iron and other relatively inexpensive materials.

Lifters Aid Handling Of Sheet Materials

■ Bastian-Blessing Co., 242 East Ontario street, Chicago, recently introduced a line of Eveready lifters,

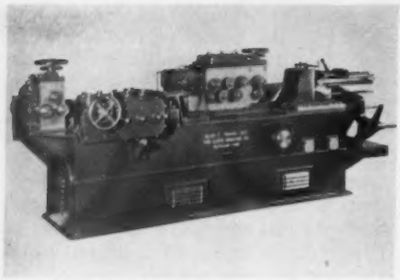
designed to provide a faster and safer method of handling sheet metals, sheet glass and other products having a smooth, nonporous surface.

These lifters incorporate large rubber vacuum cups which are provided with automatic releases that operate with a touch of the finger. These cups are the only part subjected to wear and can be replaced quickly without use of special tools. Lifters are available in five models: Two for light work, two for medium duty and one for heavy lifting.

Straightens and Cuts Various Types of Wire

■ Lewis Machine Co., 3441 East Seventy-sixth street, Cleveland, has added to its line of wire machines a new model, knows as the No. 20-F Travel-Cut shape straightening and cutting machine, equipped with a flying shear type cutoff and designed to handle square, flat hexagonal and shaped rod.

Machine has a capacity of ⅝-inch



square or equivalent area and will take flats up to 2½ inches wide. A simple adjustment of the gage permits cutting of any length required up to maximum.

In operation, rod is taken from the coil, run through the 3-roll preliminary flat straightener, passed through the two horizontal feed rolls and six edge straightener rolls and six flat straightener rolls, and comes out two vertical feed rolls perfectly straight. Then it is guided through the cutoff head and into the guide bar, where it trips the clutch and moves forward to the positive length gage, traveling with the cutoff head where it is gaged to length before being cut.

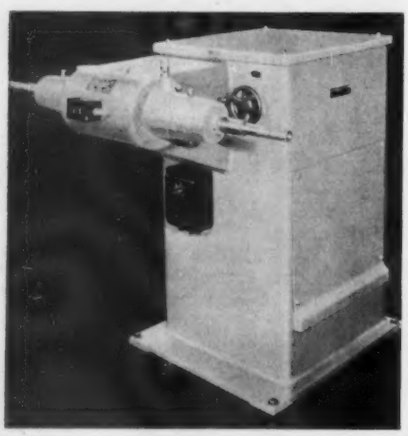
All rolls are power-driven through multiple V-belts from a 30-horsepower motor mounted in the enclosed steel base.

Polishing Lathe Has Variable Speed Feature

■ Crown Rheostat & Supply Co., 1908 West Maypole avenue, Chicago, has incorporated into its standard long-overhang polishing lathes a variable and instant speed change feature which eliminates wrench adjustments.

Scratch brushing, buffing and polishing can be performed as desired since change from one speed to another requires but a moment. By simply turning the handwheel variable speeds ranging from 870 to 3050 revolutions per minute may be obtained.

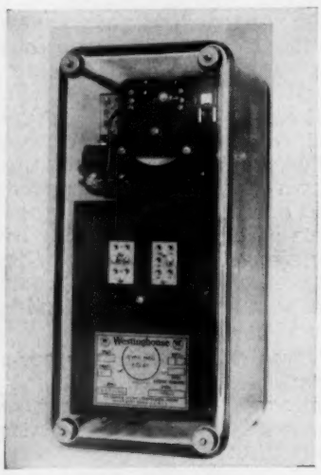
Lathe has a 14-inch overhang, allowing greater freedom in handling large and bulky work. Welded steel construction permits greater control of weight distribution and balance. Standard unit operates from a 5-horsepower motor through a V-belt drive.



Introduces Pilot-Wire Relaying Equipment

■ Westinghouse Electric & Mfg Co., East Pittsburgh, Pa., has introduced a line of HCB pilot-wire relaying equipment, designed to overcome objections to multiple-wire circuits, batteries and several relays.

This equipment uses only two pilot wires, no batteries and has only a single moving element at each end of the section of line. Complete



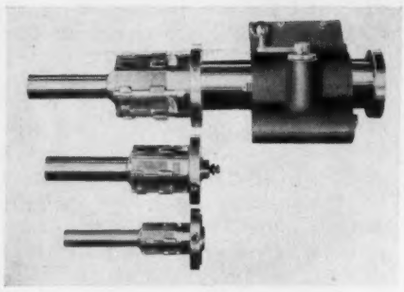
highspeed, one-cycle protection for phase and ground faults is said to be obtained by use of this device. It can be applied to existing circuits without regard to quality of, or burdens on, current transformers being used. Relay can be applied to systems having a ratio of 10 to 1 between phase current and ground current.

Relay can be used with pilot wires for a total resistance up to 2000 ohms. It permits use of insulating transformers so that differences in station ground potentials are not impressed on relays.

Announces Expanding Chaser Collapsible Tap

■ Landis Machine Co., Waynesboro, Pa., has added to its line the Style LBSR expanding chaser collapsible tap, designed for production boring and tapping of flanges, etc., where it is necessary to tap from the small diameter to the large diameter.

As shown in the illustration, a boring and a tapping head are tandem mounted on the tap body to provide



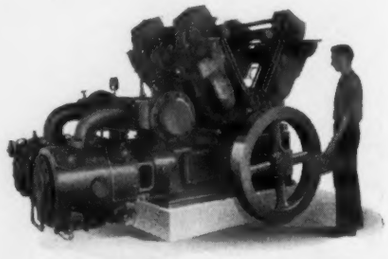
for taper boring the hole and tapping the thread in one pass of the tool. A pilot bar attached to the boring head and fitting a bushing in the machine spindle supports the tap and secures proper alignment with the work.

This design permits use of several sizes of tap head on one tap body. Graduations for the various thread lengths which can be cut are plainly stamped on the tap body. A positive, self-locking adjustment feature maintains accurate size. Adjustment is controlled through a ratchet screw in the front end of the tap. Expanding action of the tap is obtained through a single solid transverse sliding cam. Taper control cam is arranged for cutting ¾-inch taper per foot, and adjustment is provided to correct for any slight variation.

Heavy Duty Compressor Driven by Diesel Engine

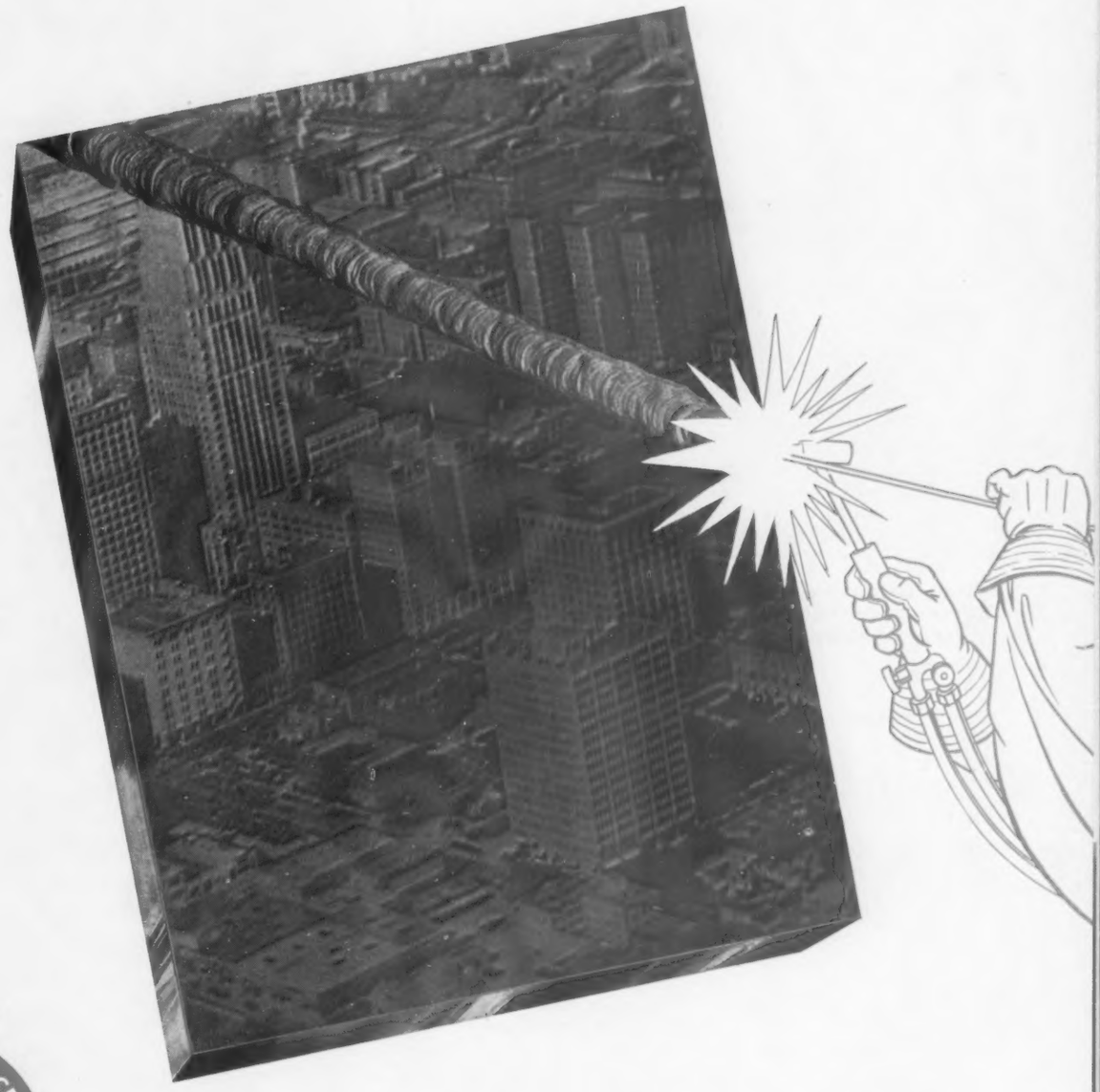
■ Ingersoll-Rand Co., Phillipsburg, N. J., has introduced a heavy duty, diesel-driven compressor, the XVO, suitable for use where economy is a primary consideration in independent or isolated compressor plants.

This machine combines a horizontal, heavy duty, double acting compressor with a V-type, four-cycle diesel engine in a single compact and comparatively lightweight unit, which operates at a moderate speed. Sizes are available for air delivery ratings of 625, 935 and 1250 cubic feet per minute for 100-pound sea-level compression. In addition, a wide variety of air, gas and am-



monia compressing cylinders is available for pressures ranging from vacuum to 5000 pounds per square inch.

INTERNATIONAL ACETYLENE ASSOCIATION MEETS



Progress and expanding applications of the oxyacetylene processes in metal producing and metal working industries during the past year are reviewed by STEEL in this special section devoted to focusing attention upon the thirty-ninth annual convention of the International Acetylene association, March 8, 9, 10, 1939, in Houston, Tex. Future progress also will be charted in this second meeting in the South.

Many Developments Feature

Hand-cutting blowpipe plus an oxygen lance quickly reduces this cast iron roll to charging box size

ALTHOUGH THE past year has been one of widespread economic changes and varying industrial production which naturally affect all industries, the oxyacetylene industry has made substantial progress through its ability to devise new processes as outlets for its products to replace business lost because of these changes. The constant advancement of the oxyacetylene industry has been due to its will and ability to serve. Its contributions are astounding, and although much of its service may not be fully appreciated, the oxyacetylene process has progressed so rapidly that today it is literally indispensible to all industry.

New cutting machines and new cutting procedures, such as stack-cutting, have been revolutionizing design requirements and manufacturing operations. New multiflame tips and welding rods are speeding the welding of pipe lines. New welding techniques are extending greatly the usefulness of the new corrosion-resistant steels that permit lightweight construction. New developments in processes such as flame hardening, flame softening and deseaming are introducing whole new conceptions in the art of metalworking.

In the fabrication of iron and steel products, the oxyacetylene process has assumed a position undreamed of a few years ago. Where once the process was used only for joining and severing, now, in addition, it shapes steel to meet all sorts of special requirements, heats steel to facilitate all manner of bending and forming operations, hardens steel surfaces which must resist wear and softens other surfaces where hardness is undesirable. Finally, the process is used for a variety of special operations of which flame-conditioning (the removal of surface defects from steel in semifinished form) is one of the latest and most spectacular.

In the meantime, although possibly overshadowed by the other more spectacular developments, the oxyacetylene flame has been further consolidating its position as a rapid and economical means for joining metals. Here, the trend has been along lines of more effective utilization of heat. This has resulted in the use of multiflame tips and the mechanization of the motion of the blowpipe with respect to the work, particularly in the case of repetitive production operations.

Install Piping Systems

Besides the new techniques and operations, the oxyacetylene process is continually branching into new fields and tackling new jobs. Although time does not permit more than a brief summary of the recent outstanding developments, it is hoped that the following review of the highlights will prove helpful in indicating how, more than ever, the oxyacetylene process is aiding the metalworking industry in speeding production, improving quality, and reducing costs.

One feature of the year was the increased acceptance of the oxyacetylene process as one which warranted a permanent investment in the form of pipe lines to distribute oxygen and in some cases acetylene from central locations to all consuming points. The general availability of pipe line oxygen throughout industrial plants, and particularly in those departments where use is heavy, is coming to be the accepted form of oxygen distribution. The service of the oxyacetylene industry in fostering, planning, and installing such piping systems has resulted in a wider use of its products, and has benefited industry in general by increasing the efficient and economic use of its processes.

Can Supply Peak Loads

The developments in the technique of supplying gases has kept pace logically with the development of large oxyacetylene machines which require high peak loads instantaneously, yet intermittently, and at hitherto unheard-of rates.

Last year, new multiflame tips were introduced which have resulted in a remarkable increase in the speed of overland pipe welding. These are for position welds and for rolling welds. With these new tips, savings in welding time have amounted to from 50 to 75 per cent for rolling welds, and from 30 to 65 per cent for position welds over single-flame welding. Considerable economies are also realized in the

By T. W. GREENE
Chairman
Oxy-Acetylene Committee

Uses of Acetylene Flame

consumption of gases and rod.

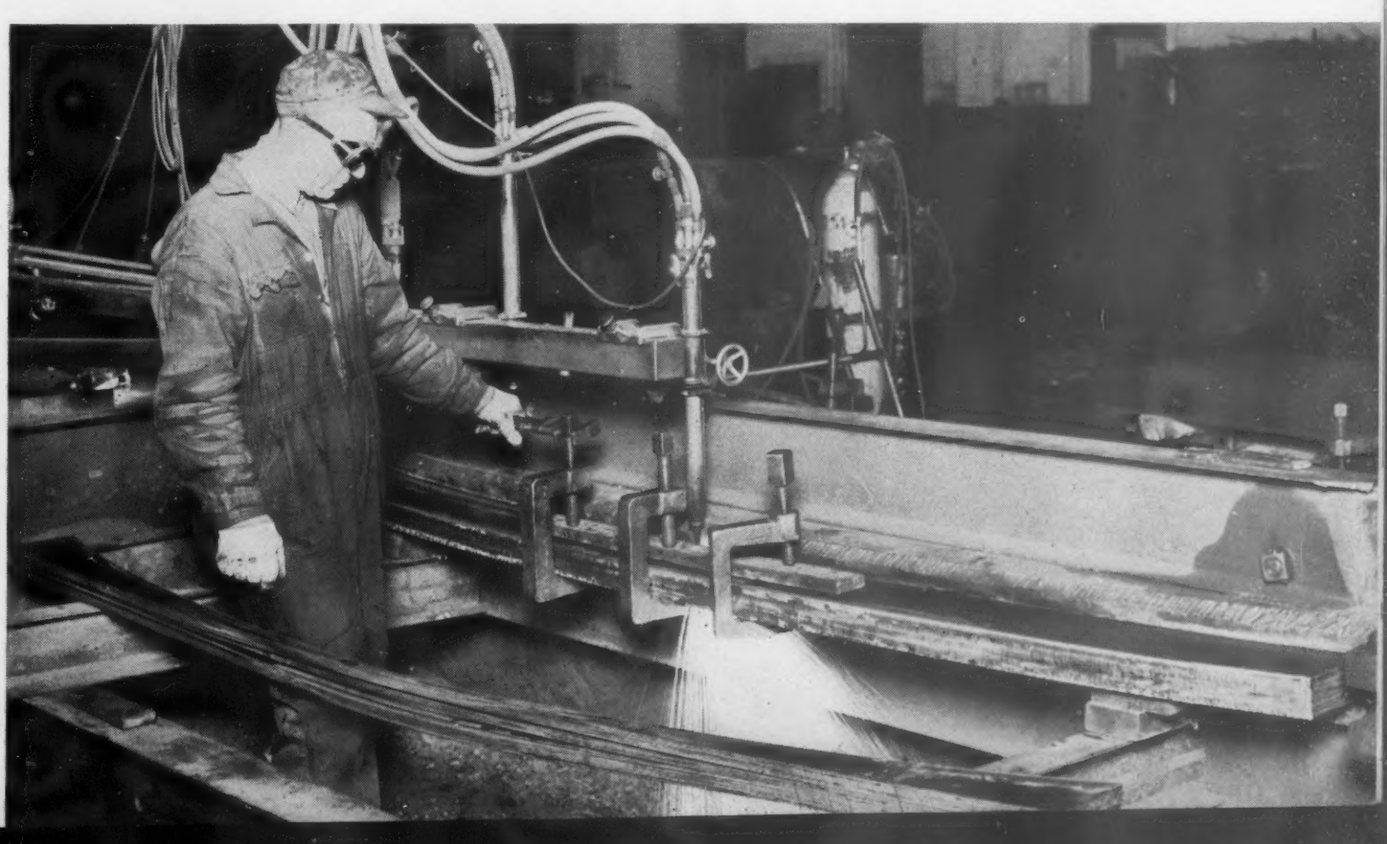
New tips and rod are not confined solely to use on overland pipe lines. They are finding rich applications in other fields where pipe is joined.

Multilayer or multipass oxyacetylene welding of heavy wall pipe for high pressure, high temperature steam and oil lines has made progress in the pipe welding field. The grain refining and stress relieving effects of multiple passes laid down with the oxyacetylene torch have enabled the obtaining of physicals, particularly in ductility and impact resistance, suitable to the most exacting service.

The problem of welding casing in the oil fields and of producing welds in the higher carbon ranges which will stand drastic quenching without serious effects on the physical properties of the pipe, have been extensively investigated with promising results. Within the past six months, multiflame tips have come into wide use for welding oil well casing. In the welding of deep-well casings, the increased speed possible with the new tips is of particular importance, as a delay in the sinking of the casing may cause the drilled hole to become clogged. With the multipleflame tip designed for this work, two operators can complete one of these tie-in welds in from 1½ to 4 minutes in casing ranging from 5 to 10¾ inches in diameter.

Machine welding with the use of multiflame heads is also contributing greatly to increased speeds in the manufacture of certain metal products. Whenever parts are produced on a quantity basis, and the same type of weld is made over and

Stack cutting emphasizes importance of oxyacetylene process in mass production machine cutting. Here 35 carlines or rafters are cut at one time from 3/32-inch steel plates



over again, it is frequently expedient to use multiflame heads and mechanize the motion of the blowpipe or torch with respect to the work. Production is not only speeded, but a neater, smoother weld is produced.

An interesting application of mechanized oxyacetylene welding is the quantity production of steel barrels and drums. Mechanized welding of pipe and tubing using multiflame oxyacetylene tips has continued to expand during the past year.

In the field of machine cutting, developments during the past year have centered along two lines—increasing the range and versatility of cutting machines, and the development of new procedures for these, as well as for the larger stationary machines.

Thus, machinery and equipment manufacturers, steel fabricators, welding shops, and maintenance departments of mills and factories now have at their disposal a full range of cutting machines for the accurate, speedy, and economical fabrication of steel to shape. This very fact is undoubtedly the primary reason for the rapid strides which have been made recently in the design of steel equipment for flame cut and welded fabrication.

Prepare Plate Edges

A particularly interesting application is plate edge preparation. By the use of multiple cutting tips the edges of plates are squared and beveled in one operation. Thus, great economy is effected in the preparation of plates and parts for welded construction of tanks, vessels, machines, ships, etc.

In stack cutting, as in the flame cutting of a single plate, the drive wheel of the cutting machine can be guided by hand or made to follow a templet design automatically. Under proper operating conditions, the surface of the cut edges on all the stacked plates is smooth and even, so that further machining is reduced to a minimum and is frequently eliminated entirely, especially if the edges of the sheets are subsequently to be welded.

Permits Large Savings

A particularly advantageous feature of stack cutting is the large saving which is usually obtained from the recovery of usable new material, because the metal removed is in sufficiently large pieces to be useful for the manufacture of other parts. Frequently, by proper designing, the scrap can be used without further fabrication. In one fabricating shop, it is estimated that usable scrap material to the value of nearly $200 is being recovered during each six-day period.

As a means for hardening the wearing surfaces of steel and iron parts, the use of the oxyacetylene flame is still very much in its infancy. Yet, during the past year flame hardening has grown by such leaps and bounds that at the end of 1938 there were already countless applications for this process. Flame hardening offers so many advantages for the localized hardening of wearing surfaces that there is literally no limit to the future possibilities of this process.

Typical of the more recent applications is the use of the oxyacetylene flame for hardening cylindrical objects, such as calendar rolls used in paper making, rolls used in the processing of sheet rubber products, steel mill rolls, leveling rolls and bearing areas of shafts. These cylindrical objects are usually hardened in a vertical position by the progressive spinning method.

One of the largest jobs thus far handled was a 12-inch diameter, 108-inch long calendar roll of forged S. A. E. 1045 steel. This roll was hardened in a vertical position with twenty-four 7-flame heating heads progressing from the bottom to the top of the roll at a speed of 4 inches per minute. The roll was spun during the hardening operation, and the whole job took one-half hour. A surface hardness of 600 to 650 brinell was obtained. This roll has now been in service six months, and, as yet, shows no signs of wear.

Rubber-processing rolls present an ideal application for flame hardening because the engraved designs on their surfaces must be distortion-free and as wear resistant as possible. Even slight damage of the engraved surface means that the rolls are beyond repair. A typical job consisted of hardening a 10-inch diameter roll to 700 brinell with twenty 7-flame heating heads. In spite of the corrugations on the surface, a uniform hardness as well as uniform depth of hardness was obtained over the entire roll surface.

More Flame Softening

Flame softening is another instance of the recent trend towards a more efficient heat utilization by means of multiflame heads. As a means for removing the undesirable hardness along the flame-cut edges of the low alloy, high strength, structural steels, flame softening is making possible the more economical fabrication of these steels for uses such as structural plates for railroad cars, gusset plates and web plates for bridges and buildings. The process is an important contributing factor towards the greater usefulness of these steels for structures where high strength and light weight are of paramount importance.

Flame softening also is being used increasingly for a variety of other applications. For instance, one steel mill uses the process to facilitate the machining of cylinders and shafts.

The use of the oxyacetylene flame for straightening, bending, forging, and forming operations, while not new, has expanded so rapidly within recent months that the process is having a marked effect on many forming and smithing practices.

Here, again, the answer lies to a large extent in the recently introduced multiflame heating heads and

Special multiflame tips designed for pipe work have increased speed of oxyacetylene welding more than 25 per cent

COME AND GET THIS PROFITABLE INFORMATION

AT THE

I. A. A. CONVENTION

Everyone interested in the oxy-acetylene process of welding, cutting, flame-hardening and hard-facing of metals is cordially invited to attend all sessions of the 39th Convention of the International Acetylene Association. March 8, 9 and 10 are the dates—and the Rice Hotel, Houston, Texas, is the place.

The papers and discussions included on the program will be full of ideas you can take back to your job to help improve your efficiency and increase your profits. If you have attended previous conventions you will want to come again. If you have never attended you can feel assured that your presence this year in Houston will prove to be a profitable investment for yourself and for your business.

There is no registration fee. You are welcome to attend every session.

CONDENSED PROGRAM SUMMARY

Wednesday, March 8

12:15 P.M.—Opening Luncheon, Address of Welcome, Keynote Address, President's Address, and Presentation of Morehead Medal. *Ballroom, Rice Hotel.*

2:30 P.M.—Technical Session "A". *Dining Room A, Rice Hotel.* General Topic: "Welding and Cutting in Petroleum Refining"—with papers on Uses of the Oxy-Acetylene Process in Petroleum Refineries, The Safe-Ending of Boiler Tubes, Welding Fittings, The Oxy-Acetylene Welding of High-Pressure Piping.

Technical Session "B". *Banquet Room No. 1, Rice Hotel.* General Topic: "Welding and Cutting in Petroleum Production and Distribution"—with papers on Gas-Welded Oil Well Casings, Latest Practices in the Pipe Line Field, Maintenance of Oil Field Equipment, Oxy-Acetylene Application of Hard-Facing Materials to Drill Bits.

8:15 P.M.—Round Table Discussions, with demonstrations of Flame-Hardening, Hard-Facing, The Testing of Welds, Casing Welding; followed by simultaneous Group Meetings to discuss such subjects as Fire Prevention and Safety, Non-Ferrous Metals, Alloy Steels, Flame-Hardening, Hard-Facing, The Testing of Welds, Well Casing, Salvaging and Reconditioning, and The Safe-Ending of Boiler Tubes. *San Jacinto High School.*

Thursday, March 9

12:15 P.M.—Annual Luncheon and Business Meeting, Reports of Oxy-Acetylene and other important committees. *Ballroom, Rice Hotel.*

2:30 P.M.—Technical Session. *Ballroom, Rice Hotel.* Special Feature Lecture followed by a Panel Discussion on "Surface-Hardening and Hard-Surfacing" by international authorities.

Friday, March 10

8:15 A.M.—Plant Inspection Trip.

2:30 P.M.—Technical Session "A". *Banquet Room No. 1, Rice Hotel.* General Topic: "Oxy-Acetylene Machine Cutting"—with papers on Flame-Cutting with Small Machines, The Oxy-Acetylene Shape-Cutting of Drilling Equipment Parts, Plate-Edge Preparation, Economics of Machine Gas Cutting.

Technical Session "B". *Dining Room B, Rice Hotel.* General Topic: "General Applications of the Oxy-Acetylene Process"—with papers on Plumbing, Heating and Air-Conditioning, The Flame-Hardening of Oil Field Equipment, Agricultural Uses of Welding and Cutting.

INTERNATIONAL ACETYLENE ASSOCIATION

ESTABLISHED 1898 — 30 EAST 42ND STREET, NEW YORK, N. Y.

large-capacity heating blowpipes. The availability of this ideal heating apparatus makes it easier than ever before to utilize fully all the advantages of the oxyacetylene flame as a convenient source of intense, localized heat. The efficiency and portability of modern oxyacetylene heating equipment, and the savings in time and reduction of floor space, are opening the way towards important development in the practices of the industrial blacksmith shop.

One of the more recent applications of oxyacetylene smithing is the field fabrication of bends in overland piping. The process, known as wrinkle bending, has a number of important advantages over other bending methods, including speed, economy and better pipe-wall characteristics.

A recent development is the use of the oxyacetylene process for removing surface defects from semifinished steel. Most steel in semifinished form — blooms, billets, slabs — has certain surface defects which if not removed will appear ultimately in the finished products. It has been easy to clean them this way.

Various terms are used to describe the process such as deseaming, desurfacing, scarfing and flame conditioning. Deseaming is generally applied to hand operations on cold slabs and billets. Here, especially designed blowpipes are utilized to "wash off" sections of the surface that contain the imperfections. Sufficient steel in the vicinity of the defect is removed to eliminate the defect itself and leave clean steel.

Flame conditioning is a general term used with particular reference to special oxyacetylene machines which remove the entire surfaces of blooms, billets and slabs, whether hot or cold. These new machines make it possible to remove defective surfaces as a part of the continuous rolling process.

Used in Oil Fields

Prominent among trends in hard surfacing has been the complete standardization on this process by oil field operators. New designs of inserts meet practically all drilling bit requirements for oil and water wells. The new inserts have an improved cross section which not only prevents them from rocking out of place when laid on the bit for hard-setting, but also assures the strongest possible bond.

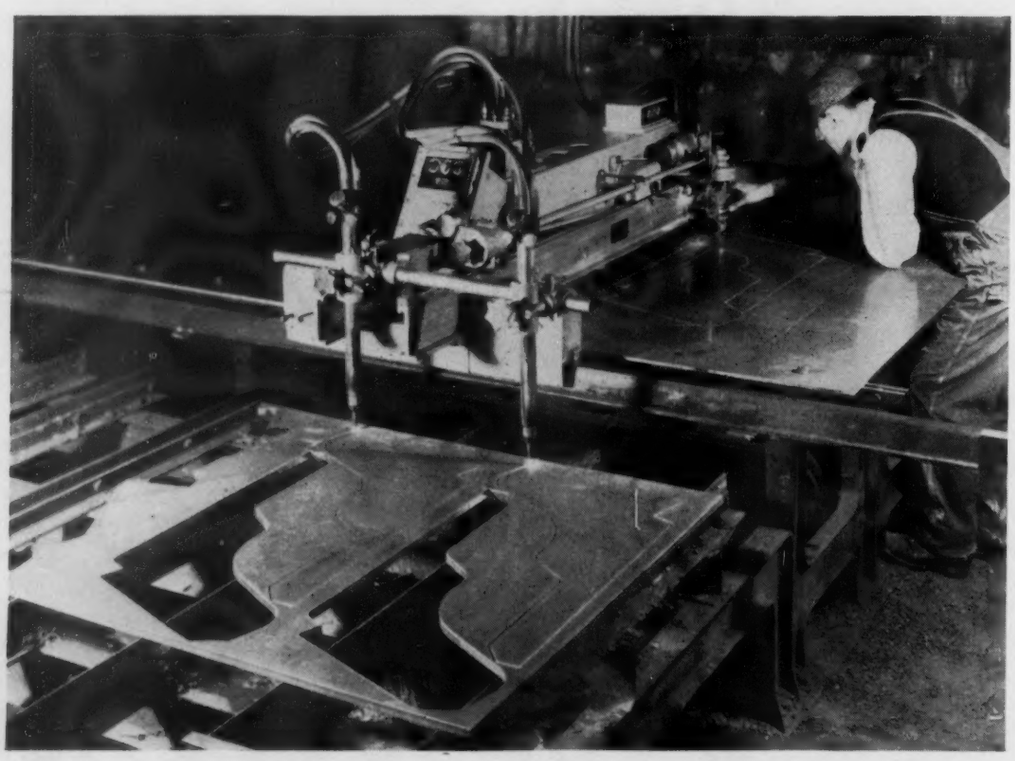
New applications also feature hard-facing progress, such as hard-faced shares which are now used to plow the ocean floor when laying transoceanic communication cables. Many parts of production machinery, too, are being protected with hard-facing alloy. A typical example is the use of wear strips of hard-facing alloy for protecting boring bars from chip abrasion. Hard facing is also being used increasingly on large power projects for such applications as dredge blades, pump shells, impellers, face plates, etc.

Valves for handling steam at the tremendous pressures and temperatures used in modern utility and other plants are protected against wear, erosion and wire drawing by a trim of hard-facing alloy applied by the oxyacetylene process. Such alloy-trimmed valves have come into wide use, not only for handling the most severe conditions, but also for handling steam at pressures as low as 150 pounds per square inch, due to longer life and economy.

The expanding use of alloy steels is paralleled by an increasing familiarity with the art of fabricating these metals by the oxyacetylene process. Welding techniques, equipment, rods, and fluxes have advanced to a stage of perfection that makes it comparatively simple to weld the low-alloy steels, the engineering steels, and the corrosion, resistant steels.

Steels of the hardenable groups, used extensively in oil refineries, are improved in welding qualities and serviceability by additions columbium. The nonhardenable, high chromium steels are improved for welding and for heat-resistant applications by the addition of nitrogen. Additions of columbium and molybdenum and increased amounts of manganese improve the welding qualities and resistance to corrosion of the 18-8 type stainless steels.

It is gratifying to note the increased recognition of the importance of welding in trade schools, colleges and universities throughout the country. Ohio State university has inaugurated a complete course covering welding and allied subjects and will issue a degree in welding engineering for the first time in this country.



Multiple flame cutting permits accurate shaping of two or more identical parts. Tracing wheel is guided by hand as shown or automatically by a templet

ADVERTISING PAGES REMOVED

"Give and Take"

Is Spirit of Scheduled

I.A.A. Round Table Sessions

OPPORTUNITIES to be heard as well as to listen will be offered those attending the Houston convention of the International Acetylene association, March 8, 9 and 10. Anyone with a question to ask or an interesting application to describe concerning some phase of the oxyacetylene process will receive a hearty welcome at the series of round table discussions planned for Wednesday evening, March 8.

As in previous years, these meetings will bring together—in an informal manner — managers, engineers, foremen, and welding and cutting operators for a frank discussion. No formal record of the proceedings will be kept. Outstanding leaders, experts in their fields, will be present to offer authoritative and unbiased advice on everyday problems relating to management, planning, design, economics, supervision and practical procedures for oxyacetylene welding and cutting.

The round table discussion meeting will begin at 8:15 p. m. with a short forum-demonstration in the auditorium of the San Jacinto High School, Holman and Austin Streets, Houston. Expert oxyacetylene welding operators will give a demonstration of flame hardening, hard facing and welding of oil-well casing.

Before the general meeting is broken up into smaller concurrent meetings devoted to particular phases of oxyacetylene welding and cutting, someone in the audience will receive the grand prize in a tensile strength estimating contest. Everyone present will be entitled to one estimate as to the ultimate strength of a specimen weld coupon which will be tested to destruction in front of the assembly.

H. C. Boardman

General chairman, round table discussions; president, American Welding society; research engineer, Chicago Bridge & Iron Co., Chicago

Each of the smaller meetings will be conducted informally by a chairman, assisted by guest technical advisers who will be prepared to answer questions on all aspects of the subject under discussion.

For the benefit of those who are interested in well drilling, the subject of one meeting will be "Oil-Well Casing Welding". The use of oxyacetylene welding in the casing of wells has been extended considerably in the past year by the introduction of new multiflame welding tips which have made possible far greater welding speeds than ever before. In the welding of deep-well casings, this increased speed is of particular importance as a delay in the sinking of the casing may cause the drilled hole to become clogged. Deep-well casing is usually welded into 80-foot lengths before it is swung into position for the tie-in weld. With the new type of tip designed for this work, two operators can complete one of these tie-in welds in from 1½ to 4 minutes in casing ranging from 5 to 10¾ inches in diameter.

The oxyacetylene flame offers so many advantages for the localized hardening of wearing surfaces that there seems to be no limit to the possibilities of the flame-hardening process, which is the subject to be discussed in another meeting. In this process, the surface of the part

Henry Booth

Chairman, testing of welds discussion; sales manager, Shawinigan Products Corp., New York

H. F. Reinhard

Chairman, salvaging and reclamation discussion; secretary, International Acetylene association

J. I. Banash

Chairman, fire prevention and safety discussion; consulting engineer, International Acetylene association

to be hardened is raised rapidly to the required temperature by the intense heat of the oxyacetylene flame and then rapidly cooled, usually by a stream of water. Parts are hardened only where the hardness is desired—such as the teeth of gears—and the depth to which the surface is hardened can be controlled within reasonable limits.

Typical of the more recent applications have been the hardening of cylindrical objects, such as calendar rolls used in paper making, rolls used in the processing of sheet rubber products, steel mill rolls, leveling rolls, and the bearing areas of shafts. These cylindrical objects are usually flame hardened by the progressive spinning method.

"Hard facing," is the subject of another meeting. Prominent among trends in hard surfacing has been the complete standardization on this process by oil field operators. New designs of tungsten carbide inserts now meet practically all drilling bit requirements for oil and water wells. New applications also feature hard-facing progress, such as hard-faced shares which are now used to plow the ocean floor when laying transoceanic communication cables. The application has been greatly extended recently to such varied objects as steel rolling mill guides, dredge blades, pump shells, steam and internal combustion engine valves, face plates, impellers and countless other parts subject to abrasive and corrosive wear.

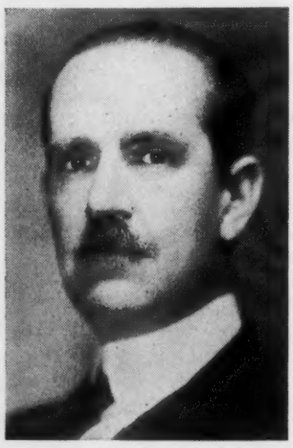
Expanding use of alloy steels is paralleled by an increasing familiarity with the art of fabricating these metals by the oxyacetylene process. Welding techniques, equipment, rods and fluxes have advanced to a stage of perfection that makes it comparatively simple to weld the low-alloy steels, the engineering steels and the corrosion-resistant steels. The latest developments in these techniques will be discussed at the meeting on "Alloy Steels." Another meeting will discuss how and when to weld nonferrous metals.

Considerable interest is expected in the group meeting on "Safe Ending of Boiler Tubes" since this will follow by only a few hours the presentation of a paper on the subject by Mr. Frank Page, chief boiler inspector of California. At present, the boiler inspection laws of Texas do not allow the application of safe ends by fusion welding in the repair of boiler tubes. Pro and con arguments on the issue will undoubtedly turn the meeting into a lively discussion with Mr. Page present to render authoritative guidance.

The ever-present problem of "Fire Prevention and Safety" will be discussed at another group meeting. Safe locations and surroundings will be discussed as well as the causes of fires and how best to prevent them. Representatives of Underwriters' Laboratories, Inc., Factory Mutual laboratories, the National Safety council and other important regulatory bodies are expected to advise and suggest the proper procedures for best accomplishing fire and accident prevention.

The versatility of the oxyacetylene flame should bring up some interesting topics for discussion at the meeton "Salvaging and Reconditioning." Cutting torches and blowpipes have long been used in demolition and salvaging operations, but more efficient techniques and work programs are constantly being developed. Because of the variety of applications of the oxyacetylene flame in general maintenance and reconditioning work, this subject always arouses considerable interest in any group of industrial people.

George V. Slottman



Philip Kearney

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Past Points Way to *Future* Progress

By ELMER H. SMITH
President
International Acetylene Association

ONE HUNDRED and three years ago Edmund Davy wrote as follows: "Early in the present year the author in attempting to procure potassium by strongly heating a mixture of calcined tartar and charcoal in a large iron bottle obtained a black substance which readily decomposed water and yielded a gas which upon examination proved to be a new compound of carbon and hydrogen." Edmund Davy was not able to see far enough into the future to know that this present gathering of men, and indeed thousands more, would spend their lives working with the gas, acetylene, produced by this "black substance" which was actually potassium carbide. Twenty-six years later, Woehler discovered another carbide, calcium carbide, the substance which made possible the commercial utilization of acetylene.

As the years passed, calcium carbide found uses and began to be employed in steadily increasing amounts. Since 1892 it has been produced in the electric furnace. On July 7, 1897, our industry had progressed to the point where it merited royal attention. At the Court of Windsor where was present The Queen's Most Excellent Majesty in Council the following law was passed: "Whereas . . . . now, therefore, Her Majesty is pleased, by and with the advice of Her Privy Council, to order and prescribe that notwithstanding anything to the contrary in the said Order in Council, the quantity of Carbide of Calcium which may be kept with or without a license shall be as follows: Where it is kept in separate substantial hermetically closed metal vessels each containing not more than one pound —five pounds; Where it is kept otherwise—none."

Forty-one years ago, the same year in which this law was passed, the International Acetylene association came into existence. Since that time this law and others just as ridiculous have been removed from the statute books. The association has been of aid both in eliminating unjust laws and in helping to formulate good ones. The association also has recognized the hazards of the industry and has endeavored to educate its members and the public in general to minimize these dangers.

In a sales manual I used just 30 years ago I find a "revised price list." The figures are enlightening from the point of view of history. Here is an example: "One oxyacetylene welding plant and one complete oxygen generating plant $2,000." This equipment was suitable for a small job welding shop and of necessity included the oxygen generating equipment unless one wished to ship his oxygen from Buffalo, New York. The price of two thousand dollars also included the "process price," the price paid at that time by a user for the privilege of using the oxyacetylene process.

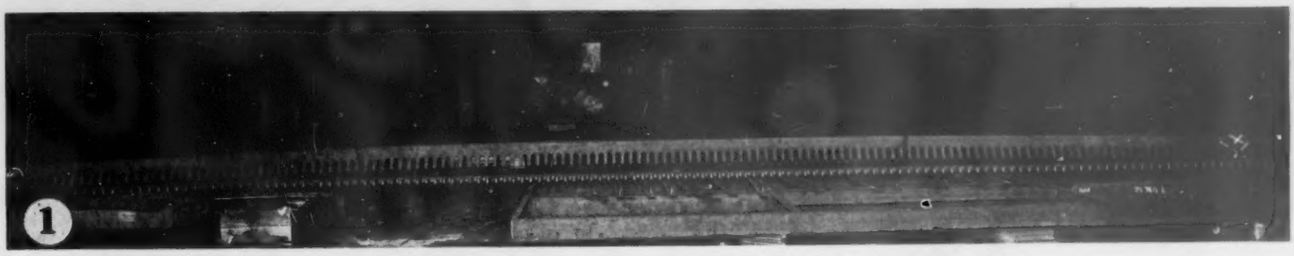
Elmer H. Smith

Compare these conditions with those of today! Most of you smile now at the thought of having your oxygen shipped in cylinders from Buffalo. Nevertheless, here in my old sales manual are freight rates from Buffalo to most of the principal cities in the United States. However I don't find Houston listed. Evidently it was more of a cattle and cotton country than an oil capital then.

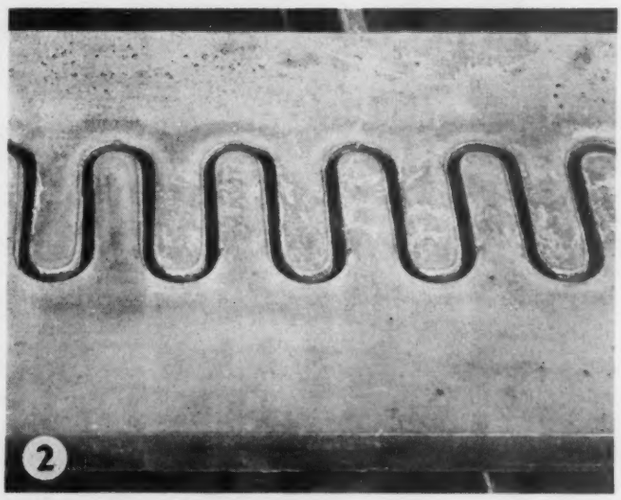
At this time chlorate of potash oxygen of 96 per cent purity was easily good for cutting thicknesses up to 1 inch. Even with icicles of slag and irregular kerf it so exceeded the speed of a hacksaw as to attract the wondering admiration of the metalworking industry. Of course, to quote . . . "the use of the cutting process would always be limited because of the high price of oxygen, but it could surely be used in emergencies to good advantage and was a method to be kept in mind. It is too bad it couldn't be used for wrecking steel structures and even cutting scrap iron." Today

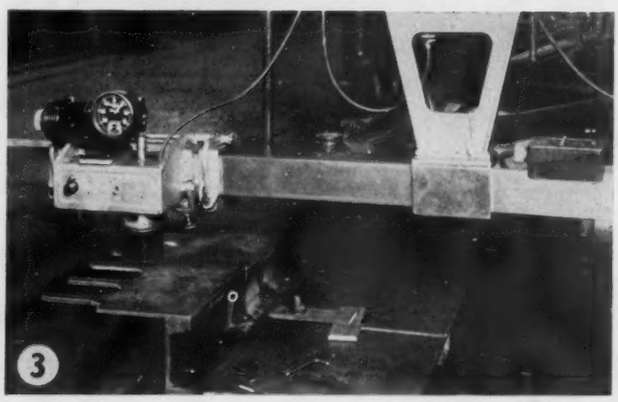
(*Please turn to Page* 82)

THIS 44-FOOT BRIDGE EXPANSION JOINT



. . . demonstrates the exceptional flame cutting and labor saving possibilities of the . . . AIRCO-DB No. 20 TRAVOGRAPH





This 44-foot expansion joint was flame cut from a single piece of copper alloy steel 15 ins. wide and 1½ ins. thick. Actual length of the zig-zig cut was 156 ft. 3 ins. Specifications called for a kerf ¼ in. wide.

Because of the extra large cutting area of the No. 20 TRAVOGRAPH—*the largest of any gas cutting machine*—the saving in handling time, plus the high cutting efficiency of the machine, made possible the completion of the job in the short time of 7 hours—a result that could not be approached with any other method.

In the preliminary planning and working out of details—an important factor on a job of this kind—the cooperation of AIRCO Field Service Engineers proved most helpful. This practical cooperation, available and freely given to all customers, is an important extra value that goes with AIRCO-DB Gas Cutting Machines.

Full details about the No. 20 TRAVOGRAPH will be supplied on request.

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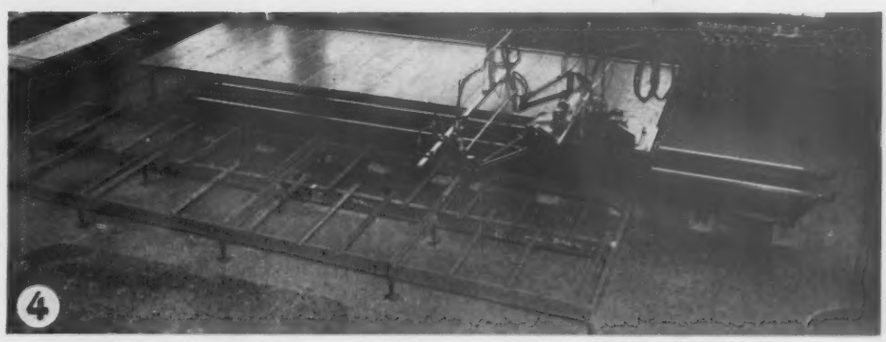
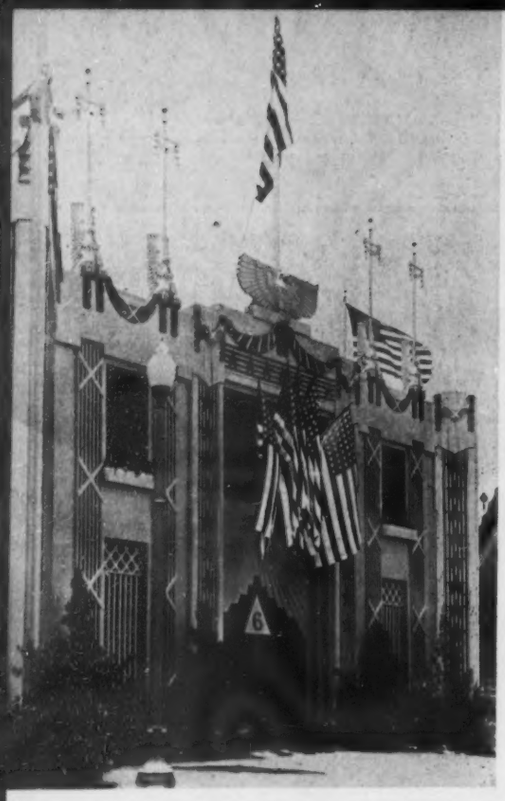
1 *View of the finished expansion joint made by the Heil Company of Milwaukee for the Blue Island bridge built by the Wisconsin Bridge & Iron Co.*

2 *Close-up of the cut. Note how uniformly the specified ¼" kerf was maintained.*

3 *Movement of motor-driven magnetic tracer, as it follows templet, is accurately duplicated by the torch on far end of the mounting bar.*

4 *The AIRCO-DB No. 20 TRAVOGRAPH with layout and work tables.*





Houston's famous convention hall where the 1928 national democratic convention was held

Houston — Industrial a

WHEN delegates to the International Acetylene association's meeting gather in Houston, Texas, on March 8, they will see one of the nation's most unusual cities.

As business men they will be interested in the city's development from a cattle and agricultural center to the world's leading oil city, one of the country's largest ports, the largest city in the Southwest and a bright spot during the depression.

Houston has many points of interest to the visitor. It is a historic place founded 103 years ago by the brothers Allen of New York. A few miles from the city, the Texans under General Sam Houston defeated the Mexican host to win independence for Texas. The battlefield is marked by the tallest monument shaft on the North American continent. Within a few hours drive may be found some of the finest salt water and fresh water fishing, excellent hunting and a remarkable beach, more than 300 miles long.

The city, named for General Houston a few months after his great victory, has had a consistently fast growth for more than 70 years. In 1860 it was a small town of less than 5000. Its population increased 70 to 115 per cent each decade until 1930, when its inhabitants numbered 292,352 according to the U. S. Census. Average rate of increase each decade was 80 per cent. The city now has an estimated population of 400,000.

Oil is credited with much of Houston's growth and prosperity, but lumber, rice and the export and import trade through the Houston ship channel have played important roles. Texas oil companies have a daily payroll of $2,500,000 distributed among some 500,000 employes, one-fourth of whom are in the Houston district.

More than 1500 oil companies make their headquarters in Houston, including practically every major oil company in the United States. It has the largest oil-tool manufacturing plants in the world, acres and acres of the warehouses and yards of oil-well supply concerns, and thousands of miles of pipelines carrying a flood of 2,000,000 barrels of oil daily from Texas and Louisiana to the Houston district refineries and tide water terminals.

Along the Houston ship channel, a 50-mile waterway connecting the city with the Gulf of Mexico, are 12 oil refineries owned by Humble, Texaco, Sinclair, Shell, Pan American, Republc, Deepwater and others. In the Houston district 250 oil fields produce a daily average of 342,000 barrels, the greatest production of any district in Texas. An average of four new fields were opened each month of 1938 in the district. From

— Fast Growing and Oil Center

the top of any of Houston's tall buildings, a visitor may see oil derricks in almost all directions.

Yet other industries are attracted to Houston. There are large rice mills, textile mills, packing houses and factories of many kinds. During 1938, 61 new factories started operation in the city. Other new businesses starting in 1938 included 237 merchandising firms, 23 financial, 41 real estate, 97 oil and 193 miscellaneous.

The continued prosperity of the city (Houston went on paying bills and there were no bank failures during the depression) is one of the reasons for the growth of Houston as an industrial center. In addition, there is available cheap fuel in the natural gas fields surrounding the city, cheap labor, 18 railroads and a first class port to furnish transportation. Low taxes (Texas has no state income nor sales tax) are also an important factor.

Large shipments of steel and other products come to Houston by way of the Mississippi river and the Intracoastal canal. Several steel firms have located along the Houston ship channel.

Near Rusk, in the territory just north of Houston, is an iron ore deposit said to rival that in the Lake Superior area. A company has been formed to develop the deposit.

Houston and the immediate gulf coast have an equable climate with no snow, little frost and much sunshine.

Upper right, the 18-story Rice hotel in center of Houston's business district is headquarters for the 39th annual meeting of the International Acetylene association in March

Skyline of downtown Houston presents this interesting view

Morehead Medal Is Awarded to

John J. Crowe

DURING THE opening session of the 39th annual convention of the International Acetylene association, John J. Crowe will receive the 1937 James Turner Morehead Medal for his unceasing and successful technical activities in the utilization of acetylene.

Bringing prestige in the oxyacetylene industries comparable to that of the Nobel prize in physics or the Pulitzer prize in literature, the Morehead medal is awarded annually by the International Acetylene association to the person or persons who in the judgment of its officers and board of directors have done most to advance the industry or the art of producing or utilizing calcium carbide or its derivatives, the most important of which is acetylene.

This award is named after James Turner Morehead who was responsible for the experiments which led, in 1892, to the discovery of the electric furnace method of producing calcium carbide. Established by John Motley Morehead in 1922, in honor of his father's work, the medal has since been awarded each year to distinguished leaders in the acetylene industry. Last year's recipient was H. Sidney Smith who collaborated in the first commercial production of calcium carbide in England.

An inscription on this year's Morehead medal, "For his unceasing and successful technical activities" is indeed a fitting tribute to the recipient. But more than that, it is a description of the man himself. Mr. Crowe has been engaged in research and development work ever since he graduated from high school in Washington, D. C., where he was born and reared. He is well known for his studies of metallurgical phenomena, his effective co-operation in the establishment of several leading metallurgical laboratories and his singular work, as manager of the Apparatus Research and Development department of Air Reduction Sales Co., in the development of apparatus for oxyacetylene welding and cutting.

He is past president of the American Welding society and the Compressed Gas Manufacturers' association, a past chairman of both the Philadelphia and New York sections of the American Society for Metals.

Starting his engineering career as an apprentice at the national bureau of standards in Washington, his first assignment consisted in testing thermometers and the making of heat measurements. In those days little was known about applying pyrometers in the exact measurement and control of intense heat. In answer to the growing demand for research along this line, Dr. G. K. Burgess, well-known metallurgist of the bureau staff, set up a separate Pyrometer division to conduct research in the field of metallurgy and chose for his assistant the young John Crowe.

Wrote Authortative Papers

While associated with the bureau of standards, Mr. Crowe co-operated in the publication of a number of authoritative papers on thermometry, pyrometry and metallurgy. By 1915, Mr. Crowe had been advanced to associate physicist in charge of a section in the bureau and in that year he was "loaned" to the United States navy department to assist in the development of anchor chain at the Boston navy yard. Mr. Crowe was instrumental in developing a heat treatment for the finished chain which would enable the metal to meet effectively the severe conditions to which these battleship chains were subjected. This work soon lead to the supervision of the heat treatment of all forgings and castings, and to the establishment of a physical testing and metallurgical laboratory at this yard. Later, Mr. Crowe assisted in the establishment of similar laboratories at New York, Norfold and Philadelphia navy yards.

Instead of returning to the bureau of standards, Mr. Crowe accepted an appointment as physical metallurgist with the navy department. At the Philadelphia navy yard he assisted in the planning, installation and operation of a large forge shop there, and in training personnel for the metallurgical control of forge and foundry as well as for the naval aircraft factory.

During this period Mr. Crowe had his first real contact with practical applications of fusion welding and cutting by the oxyacetylene process. By use of various applications of oxyacetylene welding and cutting he was successful in effecting great savings in the cost of producing large forgings and castings.

While at the navy yard he took an active interest in what is now the American Society for Metals, and started a course in metallurgy at Temple university in Philadelphia. During this period Mr. Crowe also acted as consulting engineer in many important developments.

Since becoming engineer in charge of the apparatus research and development laboratories of the Air Reduction Sales Company in 1924, Mr. Crowe has contributed considerably to the great progress of the acetylene industry in manufacturing, maintenance, construction, refining railroad shops and many other fields. In addition, he has written a number of noteworthy papers, including "Economies Through the Use of High Purity Oxygen," published in the journal of the American Welding society in 1935, and "Effect of Tip Sizes and Pressures Upon Economy of Cutting," published in proceedings of the International Acetylene association for 1928. He is also the author of the chapter on "Oxygen Cutting" in the handbook recently published by the American Welding society.

ADVERTISING PAGES REMOVED

DEMONSTRATION AND DISCUSSION TO FEATURE

Safe Ending

OF BOILER TUBES

AT THE Convention of the International Acetylene Association at Houston, March 8, 9, and 10, there will be demonstrations and full discussion covering the practice of safe ending of boiler tubes by fusion welding. This is of particular interest to a Texas meeting inasmuch as Texas and a few neighboring states, namely, Arkansas, Oklahoma and Louisiana are among the few states which have forbidden the practice.

Today the proponents of the fusion welding processes point out that with modern tools, welding equipment, rods, methods and qualification procedures, welds of high quality and great strength are obtainable and do not warrant the continuance of the prohibition against this particular application of fusion welding. They cite as an example of the practicability of the process, the experience of the many railroad shops and in particular, of one railroad company in the East that has applied safe ends by oxyacetylene welding for 20 years; one boiler tube being cleaned in the shop was observed to have had 14 safe ends and was ready for replacement in the boiler, apparently as good as new.

Safe ending, sometimes called reending, is a process of restoring boiler tubes to their original length for replacement in a fire-tube boiler. Tubes are ordinarily removed about every two years to be cleaned of scale accumulations. Occasionally some tubes develop leaks and must be removed. Removal causes destruction of several inches of the tube at each end because it is necessary to cut into the edges of the tube where they have been expanded into the opening in the tube sheet and beaded. When the tubes have been cleaned and are ready for reinsertion, they are then too short. Unless it is possible to add on a short length of tube, the only alternative is a completely new tube. As many stationary boilers have as many as 150 to 200 tubes, completely new replacement every two years is expensive.

Since boiler tubes vary in diameter from 2 to 4 inches, and from ⅛ to 5/32-inch in wall thickness, it is a relatively simple matter to add a section to the shortened tube by means of an ordinary, butt type, fusion weld. Forge welding is generally permitted, but this process requires specialized technique and special equipment which generally reduces the speed and efficiency of the method. Fusion welding advocates point out that to weld safe ends on the tubes, it is only necessary to cut the ends off square, give them a slight bevel, and lay them in an alignment jig such as an ordinary steel angle iron placed horizontally with the vee upward. Then the joint is tack welded and with a helper turning the pipe, the welding operator can complete the joint in a few minutes.

C. D'W. Gibson

According to the secretary of the International Acetylene association, the demonstrations, papers and discussions on safe ending will show that fusion welding is a thoroughly reliable as well as an economical method of applying safe ends to boiler tubes. California was one of the early states to incorporate in its boiler inspection laws the recommendations of the A. S. M. E. Boiler Construction code, and has since developed a highly efficient system for qualifying and periodically testing welding operators and welding work in the administration of those laws. Frank Page, chief boiler inspector of California, will tell the convention of his work in California with particular reference to the safe ending of boiler tubes. C. O. Myers, chief boiler inspector of Ohio will also speak of such work in his state. There will, as noted above, be an actual demonstration of safe ending by oxyacetylene welding to show how quickly and efficiently welded safe end joints can be made.

Official Program

of the 39th Annual Convention of the International Acetylene Association, Houston, Texas, March 8, 9 and 10

Wednesday, March 8

10 A. M.—Rice Hotel

Registration

12:15 P. M.—Ball Room, Rice Hotel

Opening Luncheon

Chairman: Elmer H. Smith, president, International Acetylene association; president, Commercial Gas Co., Minneapolis.

Vice Chairman: H. P. Dolisie, vice president, International Acetylene association; managing director, Canadian Liquid Air Co. Ltd.

Address of Welcome by J. W. Evans, vice president, U. S. Chamber of Commerce, Houston; chairman, Port Commission of Houston.

Keynote Address by J. H. Van Deventer, editor, *The Iron Age*, New York.

President's Address by Elmer H. Smith.

Presentation of Morehead Medal by C. D'W. Gibson, past president, International Acetylene association; vice president, Air Reduction Co. Inc., New York.

Acceptance of Morehead Medal by John J. Crowe, manager, Apparatus Research and Development department, Air Reduction Sales Co., New York.

C. E. MacQuigg

2:30 P. M.—Dining Room A, Rice Hotel

Technical Session A

"Welding and Cutting in Petroleum Refining"

Chairman: R. L. Dudley, president, Gulf Publishing Co., Houston.

Vice Chairman: C. W. Obert, Union Carbide and Carbon Research Laboratories, Inc., New York.

Uses of the Oxyacetylene Process in Petroleum Refineries by Henry Jouette, welding superintendent, Magnolia Petroleum Co., Beaumont, Texas.

Safe Ending of Boiler Tubes by Frank Page, chief boiler inspector, State of California, San Francisco, Calif.

Welding Fittings by E. Hall Taylor, vice president, Taylor Forge & Pipe Works, Chicago, Ill.

Oxyacetylene Welding of High Pressure Piping by A. N. Kugler, mechanical engineer, Air Reduction Sales Co., New York, N. Y.

2:30 P. M.—Banquet Room No. 1, Rice Hotel

Technical Session B

"Welding and Cutting in Petroleum Production and Distribution"

Chairman: L. H. Courtright, welding foreman, Reed Roller Bit Co., Houston; chairman, South Texas Section—A. W. S.

Vice Chairman: H. L. Rogers, Air Reduction Co., Inc., New York.

Gas Welded Oil-Well Casings by G. R. Milton, shop foreman, Sinclair Prairie Oil Co., Arp, Texas.

Review of Latest Practices in the Pipe Line Field by W. B. Poor, construction engineer, United Gas Pipe Line Co., Houston, Texas.

Maintenance of Oil Field Equipment by C. G. Alhart, welding superintendent, Texas Iron Works, Houston, Texas.

Oxyacetylene Application of Hard Facing Materials to Drill Bits by Charles H. Shapiro, chief metallurgist, Reed Roller Bit Co., Houston, Texas.

8:15 P. M.—San Jacinto High School Auditorium

Round Table Discussions and Demonstrations

General Chairman: H. C. Boardman, president, American Welding society; consulting engineer, Chicago Bridge & Iron Co., Chicago, Ill.

General Vice Chairman: J. I. Banash, consulting engineer, International Acetylene association.

Demonstrations to be made include flame hardening, hard facing, testing and casing welding.

Subjects of group meetings include fire prevention and safety, nonferrous metals, alloy steels, hard facing, flame hardening, testing of welds, well casing, salvaging and reconditioning, and safe ending boiler tubes.

Dr. A. B. Kinzel

Low Fuming Welding Rods

ANACONDA 997 (Low Fuming) Welding Rod — high strength, tough weld metal with low fuming characteristics—has been added to the extensive line of Anaconda copper alloy welding rods. It is widely used for the general oxy-acetylene repair-welding of cast and malleable iron, steel and copper . . . It is particularly valuable where repairs must be made quickly and easily on machinery parts, automobile engine blocks and similar equipment. Anaconda 997 Welding Rod is manufactured under United States Patents Re 17,631 and 1,525,058. Available from supply houses handling Tobin Bronze and other Anaconda Welding Rods. 38250

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Anaconda Welding Rods

Thursday, March 9

12:15 P. M.—Ball Room, Rice Hotel

Annual Luncheon and Business Meeting

Chairman: Elmer H. Smith, president, International Acetylene association.

Vice Chairman: H. S. Smith, chairman, executive committee, International Acetylene association, New York.

Address by George A. Hill, vice president, American Petroleum institute; president, Houston Oil Co., Houston.

Reports of . . .

Oxyacetylene Committee by T. W. Greene, The Linde Air Products Co., New York.

Consulting Engineer by J. I. Banash, consulting engineer, International Acetylene association, Chicago.

Technical and Engineering Committee by H. S. Smith, The Prest-O-Lite Co., Inc. New York.

Secretary by H. F. Reinhard, Union Carbide Co., New York.

Treasurer by Henry Booth, Shawinigan Products Corp., New York.

Auditing Committee by Philip Kearny, president, K-G Welding & Cutting Co., New York.

Membership Committee by Henry Booth, New York.

Resolutions Committee by F. E. Rogers, Air Reduction Sales Co., New York.

H. Sidney Smith

Report of Nominating Committee, and Election of Officers.

2:30 P. M.—Ball Room, Rice Hotel

Technical Session

"Surface Hardening and Hard Surfacing"

This will feature a special lecture, followed by a pre-organized and pre-rehearsed panel discussion led by the chairman.

General Chairman: Dr. A. B. Kinzel, past chairman, Iron and Steel division, American Institute of Mining and Metallurgical Engineers; chief metallurgist, Union Carbide and Carbon Research Laboratories, Inc., New York.

Surface hardening and hard surfacing lecture by C. E. MacQuigg, dean, College of Engineering, Ohio State University, Columbus, Ohio.

Panel discussion by John J. Crowe, past president, American Welding society; research engineer, Air Reduction Sales Co., New York.

Ernest E. Thum, editor, Metal Progress, Cleveland; former professor of metallurgy, University of Cincinnati.

Friday, March 10

8:30 A. M.

Inspection Trip

2:30 P. M.—Banquet Room No. 1, Rice Hotel

Technical Session A

"Oxyacetylene Machine Cutting"

Chairman: A. I. Sellers, superintendent of shops, Southern Pacific Lines, Houston, Texas.

Vice Chairman: Dr. G. V. Slottman, Air Reduction Sales Co., New York, N. Y.

Flame Cutting with Small Machines by Walter B. Van Wart, vice president, Wyatt Metal and Boiler Works, Dallas, Texas.

Oxyacetylene Shape Cutting of Drilling Equipment Parts by L. W. Stahl, Emsco Derrick and Equipment Co., Houston, Texas.

Plate Edge Preparation by J. H. Troger, Federal Shipbuilding and Dry Dock Corp., Kearny, N. J.

Economics of Machine Gas Cutting by G. M. Deming, research engineer, Air Reduction Sales Co., New York, N. Y.

2:30 P. M.—Dining Room B, Rice Hotel

Technical Session B

"General Applications of the Oxyacetylene Process"

Chairman: Gorham Woods, chief engineer, Hughes Tool Co., Houston, Texas.

Vice Chairman: E. L. Mills, vice president, The Bastian-Blessing Co., Chicago, Ill.

Plumbing, Heating and Air Conditioning by Frank Wallace, C. Wallace Plumbing Co., Dallas, Texas.

Flame Hardening of Oil Field Equipment by M. O'Hara, production manager, International Derrick and Equipment Co., Beaumont, Texas.

Agricultural Uses of Welding and Cutting by Mills H. Byrom, engineering division, Agricultural Experiment station, College Station, Texas.

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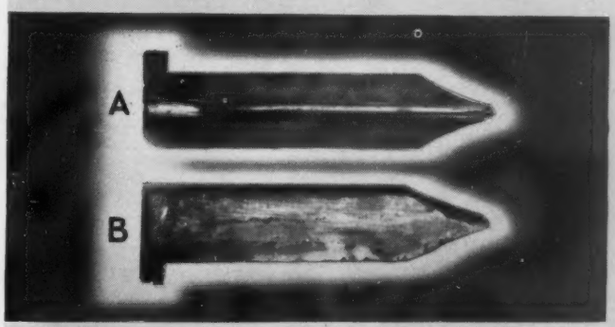
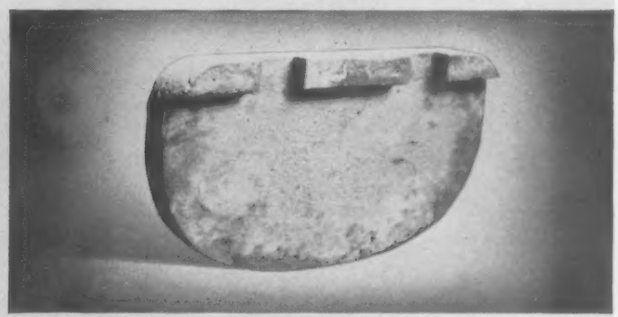
with Haynes Stellite Alloy

METALWORKING—The cutting edge of this shearing die for stamping tin can tops has a layer of Haynes Stellite alloy applied with the oxy-acetylene blowpipe to give it 4 times the life of steel dies not hard-faced.

POWER—This disk and seat for a 16-in. valve, hard-faced with Haynes Stellite alloy by the oxy-acetylene process and ready for finish-grinding, will handle 350,000 lb. of steam per hr. at 400 lb. pressure and 750 deg. F.



STEEL—These rolling mill guides have been used 70 hr. A, of cast iron, must be discarded; B, of low-carbon steel hard-faced with Haynes Stellite alloy by oxy-acetylene welding, will last 400 hr. and can be hard-faced again.



COKE—The life of this cast steel ramhead for a coke discharging machine has been increased from 9 weeks to 59 weeks by the application of a coating of Haynes Stellite alloy to the wearing surface by oxy-acetylene welding.

Write for the 104-page book, "Hard-Facing With Haynes Stellite Products, S3-09," which shows how these products can reduce wear and save money. There is no obligation.

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Foreign Sales Department—New York City

Haynes Stellite hard-facing rods and information on other Haynes Stellite Company products also are available through all apparatus shipping points of The Linde Air Products Company

President's Message

(*Concluded from Page* 70)

we are surpassing even the airiest wishes of this early observer.

I have given you these brief glances into the past to show you how the industry we have today was developed, from the first discovery of acetylene over a century ago, the beginnings of our association 41 years ago, and finally the condition of the industry in its childhood when I entered it 30 years ago. You who know so well the present state of the industry are fully capable of seeing for yourselves how far we have come.

Abraham Lincoln observed, "The only method we have of judging the future is by the past." Judging in this way I prophesy that the years to come will hold far-reaching developments to be utilized by you younger men of the industry. Already your choice of welding rod is not limited as ours was to brass spelter wire for bronze welding, old trolley wire for copper welding, scrap crankcase aluminum cast into strips in an angle iron for aluminum repair jobs, and a bundle of rusty Norway iron for all classes of steel work. Your tools and equipment have advanced as the craft has developed. We shall expect you to make full use of them and to help accelerate by new developments the line of advance which our industry has already made.

May I call your attention to the publication of the International Acetylene association's convention proceedings in book form issued annually to all of you. This publication is a most up-to-date as well as a most comprehensive work.

Furthermore, I hope you will make the most of the opportunity you have at this convention for discussion. Do you have a question that has baffled you for years? A problem you can't solve?. Someone here is undoubtedly both willing and able to help you. For we have here a gathering of men with but one thought in mind, one common goal, the advancement of the acetylene and allied industries. Uniting our efforts in a spirit of co-operation will continue to solve our problems.

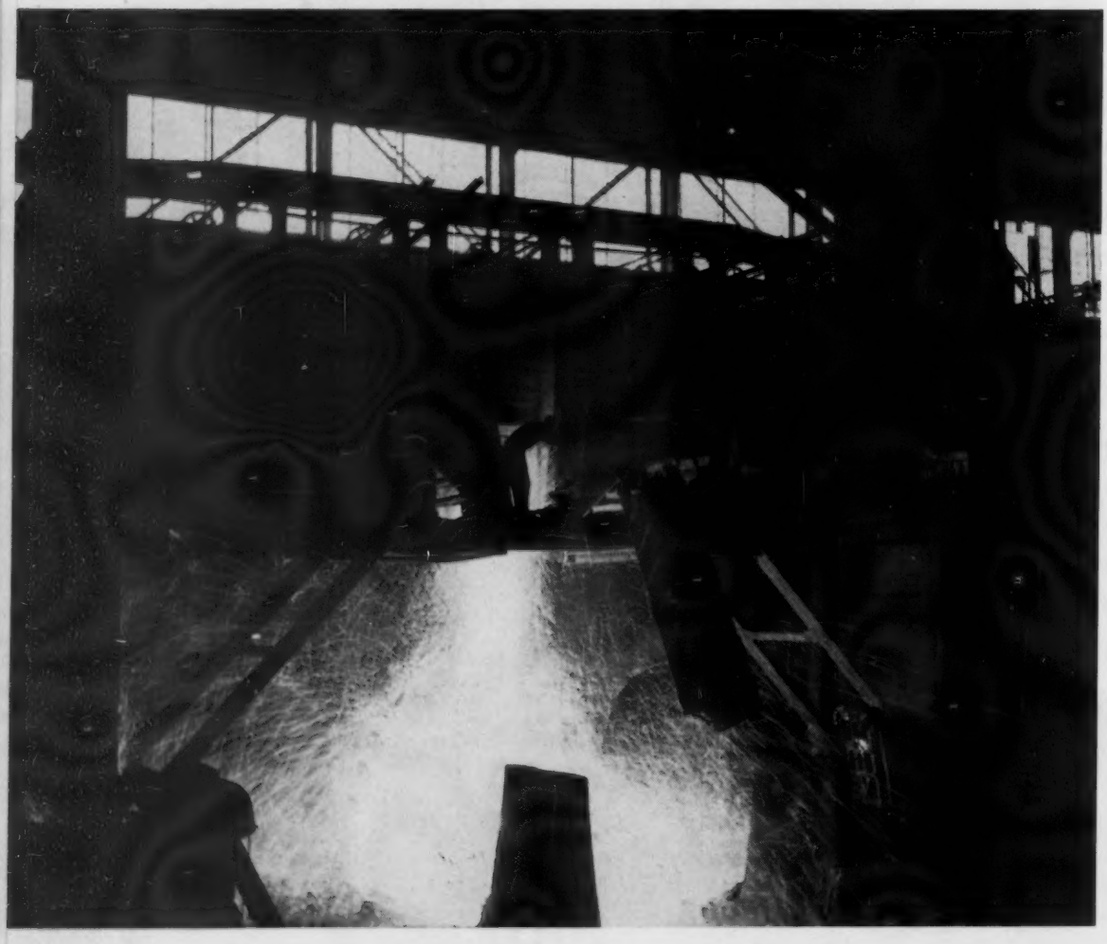
Studies Soil's Effect on Corrosion of Steel Pipe

■ In a research report to the American Chemical society describing recent studies approaching the problem of corrosion of buried steel pipe from the point of view of soil characteristics. Dr. Walter F. Rogers, Gulf Oil Corp., Houston, Tex., states that while both electrical resistivity and acidity of soils have some effect on corrosion, the governing factor is soil volume-water content.

Soils which become admixed with oil are frequently highly corrosive, Dr. Rogers found. When soil particles become coated with oil, they do not coalesce but remain in the abnormal condition of being loosely packed and possessing a high porosity. This condition produces rapid corrosion rates.

To determine in the field whether or not a soil is corrosive, Dr. Rogers recommended that a seasonal study be made of its variation in moisture-air values. This type of investigation cannot be made at present along an extensive pipe line because of the labor involved.

Certain conclusions are drawn regarding the value of protective pipe coatings. Use of a permanent nonrotting wrapping material around the pipe without any coating between lowers the corrosion rate considerably, it was pointed out, although there will continue such corrosion as is experienced under slow conditions of wetting and drying. A coating placed between the pipe and the wrapper reduces the corrosion rate still further.



Cleaning open-hearth slag hole with an oxygen lance at the Lakeside plant of Otis Steel Co., Cleveland

Carnegie-Illinois Mill Uses 60 Miles of Pipe

(*Concluded from Page* 37)

pickling department alone requires an acid storage of 50,000-gallon capacity. Palm oil treating and tinning departments contain a battery of four rubber lined tanks set up with all rubber piping, fittings and rubber lined pumps. The tinning department also contains a hydrogen evolution plant which requires pipe installations of every major type of pipe material. A central neutralizing plant receives acid sewage through a 12-inch rubber lined steel pipe prior to discharge with other sewage.

Nearly all types of oil and grease systems of lubrication are employed. Four separate pressure systems are used in one installation for the lubrication of main mill motors and motor generator sets, reduction gear drives, and pinion stand and backup roll bearings. These systems furnish flow lubrication to all gear meshing points and bearings. They have capacity of about 50,000 gallons of lubricating oil. About 100 tons of pipe in sizes up to 16 inches in diameter were installed in these systems alone. Lubrication piping utilized welding and bending wherever possible, minimizing the use of fittings.

Cold mills are lubricated by several systems with capacities ranging from 500 to 10,000 gallons, pipe sizes up to 14 inches. The 54-inch reversing mill contains an outstanding forced feed lubrication installation, including one system for oil and another system for grease.

•

Lithographed Sheets

(*Concluded from Page* 47)

the color coats as well as the varnish coat receives a bake in the oven at a temperature between 250 and 300 degrees Fahr. for about 20 minutes. Speed of the press is limited by the ability of the operator to feed the sheets into the press. A total production of 13,000 passes, or sheets, in eight hours has been recorded, this of course including all set-up time as well as actual time in production.

Since dexterity of the operator is at present the limiting factor in speed and since higher production is desired, an automatic feeder is being considered which is expected to operate at speeds up to 70 sheets per minute. This of course will greatly increase production of the processing line.

Practically all coatings are applied so a margin of bare metal remains on the side ends of the sheet to permit welding the shell and avoiding burning and blistering. This margin is spray coated when the welding operation has been completed.

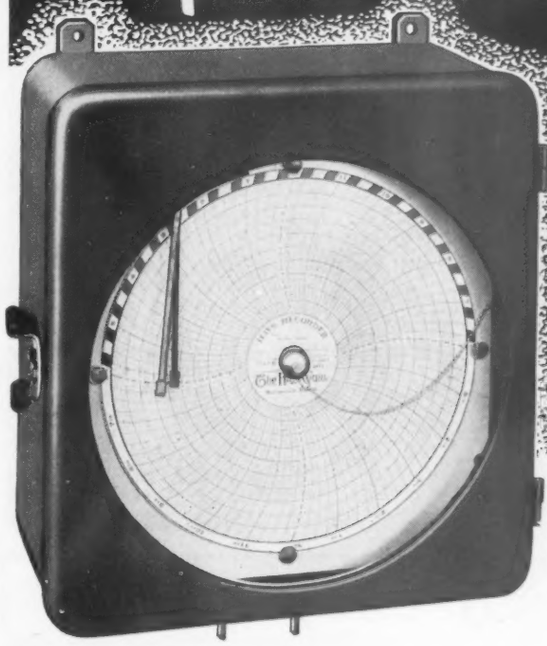
The flat sheets are run through the stamping and forming operations necessary to shape them into the desired form for fabrication without breaking or chipping off the finish applied as described above. In fact a considerable amount of these sheets are used as drum heads which are crimped in place without destroying the decorative finish on the sheet.

To Install Large Planer

■ To handle more exacting requirements in the manufacture of large drop forging hammers, Erie Foundry Co., Erie, Pa., is installing a new planer of the double housing type, 16 feet 6 inches between housings and 14 feet 3 inches under the rail. Weighing almost 500 tons, it will occupy a floor space, 40 x 100 feet, and will be served by a crane of 150-ton capacity.

This new equipment has been necessary due to the tremendous increase in size of drop hammers built in the last two years.

Super-Sensitive



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Instrument cases are of either cast iron or aluminum—to resist corrosion in different atmospheres. HAYS "OT" Recorders are built husky enough to withstand dirt-laden air and severe operating conditions yet sensitive enough to register accurately increments of .0025 of an inch water. They are built to meet your particular operating requirements. Write to 960 Eighth Avenue, Michigan City, Indiana, for more detailed information.

The HAYS CORPORATION

SINCE 1901 COMBUSTION INSTRUMENTS AND CONTROL

MICHIGAN CITY, INDIANA, U.S.A.

Retractible Crane

(*Concluded from Page 52*)

So it was decided to install a special retractible monorail crane.

This crane is mounted on a hinge above the doorway, where it meets a monorail track leading into the plant. The hinged supporting structure is an A-frame, resting upon concrete footing blocks sunk in the surface of the street. Sufficient clearance is provided for a heavy truck to pass under the crane rail. When not in use, the crane is drawn up against the building by means of a safety screw hand-winch set inside the plant. In this position it offers no obstruction whatever to the public thoroughfare.

With this crane installation, unit loads are taken from delivery trucks spotted beneath the bridge. A special tong-type grab suspended from a standard chain hoist mounted on an 8-wheel trolley permits movement of loads from truck to storage in a fraction of the time formerly required.

Original bundles of steel sheets are not disturbed until placed in position on tables in line with shears and other fabricating machinery. Thus individual sheets remain untouched until fed to process, eliminating damage and rust due to rough handling and exposure.

From storage steel is moved directly to shears and then to forming and welding machinery manually and by means of floor trucks. Production is almost straight-line, and the plant is so compact that handling is simple. The most serious handling problem of this company was solved by installation of the retractible crane.

•

Steel, Iron Pipe Flange Standards Are Revised

■ American Society of Mechanical Engineers, 29 West Thirty-ninth street, New York, has issued a revised standard covering steel pipe flanges and flanged fittings, incorporating changes since the 1932 edition. New material and important changes include dimension tables for the 2500-pound series of steel pipe flanges and fittings, welding neck flanges and fittings, slip-on welding flanges, for 150 and 300-pound pressures, blind flanges for all pressures, ring joints for 150 to 2500-pound pressure; revised temperature-pressure ratings; dimensions of reducing screwed flanges for 150 to 2500-pound pressures.

The society has also issued revised American standard for cast iron pipe flanges and flanged fittings, bringing the 1928 edition up to date. A new American standard will be published about March 1 on face-to-face dimensions of ferrous flanged and welding end valves, including wedge gate, double disc gate, globe and angle and swing check valves.

Compare Merits of Acid And Alkaline Solutions

■ Two new publications of the International Tin Research and Development council, Nos. 82 and 83, have been prepared with a view to helping users of tin decide for themselves the respective merits of acid and alkaline baths used in producing coatings of tin by electrodeposition.

Alkaline solutions have been investigated by S. Baier and R. M. Angles. Their experiments are described and conclusions outlined in publication No. 82. Research with regard to acid solutions is reported by A. W. Hothersall and W. N. Bradshaw in publication No. 83. Copies of either booklet may be obtained from the council, Fraser road, Greenford, Middlesex, England.

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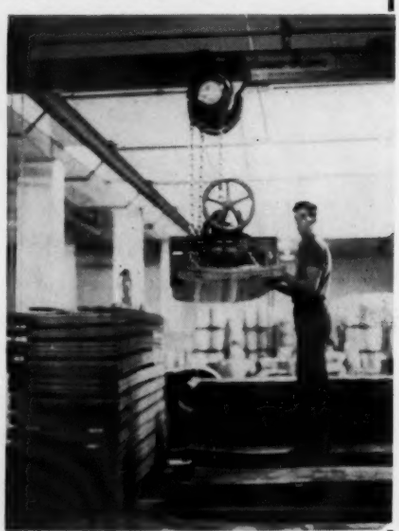

J-B ENGINEERING SALES COMPANY
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Foundrymen Air Shop Problems

■ STEEL, gray iron, malleable and nonferrous foundry problems and job evaluation were topics sharing attention at the second annual regional foundry conference at the Schroeder hotel, Milwaukee, Feb. 16-17. Sponsored by the Wisconsin chapter of the American Foundrymen's association and the department of mining and metallurgy, University of Wisconsin, the conference was attended by 600 foundrymen of the district (STEEL, Feb. 20, page 20).

P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill., described methods and materials employed in producing malleable iron in the conventional-type air furnace fired with powdered coal. The morning heat is made up of 45 per cent sprue, 10 per cent malleable scrap and 45 per cent pig iron. Charge for the afternoon heat contains 45 per cent sprue, 12 per cent malleable scrap, 3 per cent steel and 40 per cent pig iron.

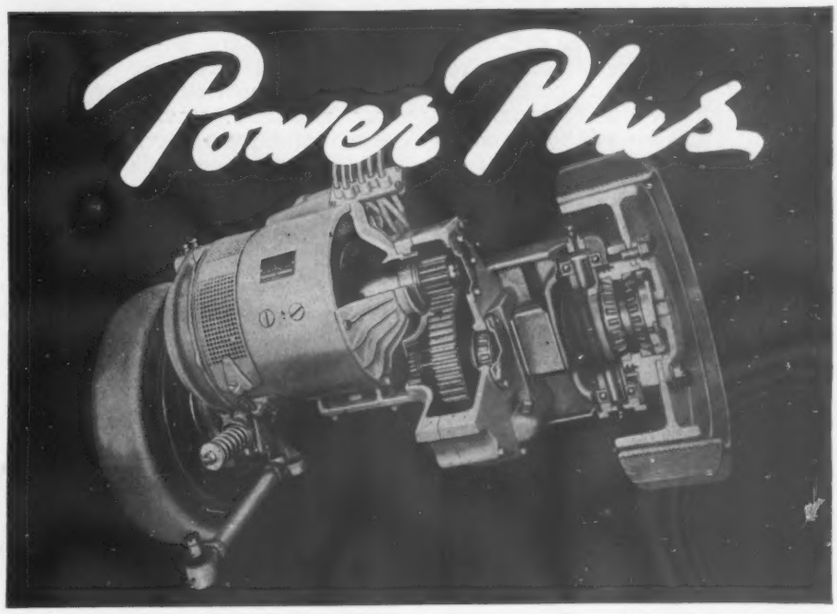
Cites Objections to Scrap

The speaker claimed that malleable iron scrap is open to objection when used in large amount. Serious error may appear in the final analysis. Rust, in some instances amounting to 4 per cent, is a total loss; it forms an oxidizing slag and has great effect on silicon and carbon. Coal consumption is approximately 700 pounds per ton. In the morning heat, metal is melted at the rate of 20 minutes per ton for a 15-ton heat and at the rate of 17 minutes per ton for a similar heat in the afternoon. Iron is taken from the furnace at the rate of approximately 2 minutes per ton.

Operation of a cupola on long heats was discussed by John Lowe, consultant, Lansing, Mich. The speaker described construction and operation of a water-cooled cupola in which the bottom is dropped only at week ends. Water is circulated through a water jacket which surrounds the cupola in the melting zone area above the tuyeres.

Mr. Lowe admitted that the arrangement might not appeal to the average foundryman operating a cupola for 1 or 2 hours per heat, but it has proved decidedly advantageous in its present installation. The unit is in operation 18 hours per day, then is drained and allowed to stand 6 hours, after which a new bed is adjusted, charges placed and melting resumed.

Relative cost of coke in proportion to cost of other factors in cupola melting is so low that no ex-



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Thanks to the mechanical advances innovated by Yale, this drive unit offers EXTRA power. Made up of a balanced double reduction of drop forged chrome nickel steel gears that are heat treated and operate in a bath of oil—it provides years of trouble free service.

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cuse exists for skimping either in price or quality, declared C. L. Waggoner, plant manager, Interlake Iron Corp., Chicago. The speaker, giving an approximate breakdown of various operation factors, shows that labor costs 73 per cent of the total, iron 24 per cent, and coke only 3 per cent.

"Job Evaluation" was discussed by C. W. Pendrock, president, LeRoi Co., West Allis, Wis., and "Foundry Job Evaluation" by E. L. Roth, president, Motor Castings Co., Milwaukee. Mr. Pendrock claimed that in view of changed conditions it behooves the modern manager to adopt a new technique in the evaluation of jobs and in setting of rates of pay. In developing his theme, he listed important factors, including education, knowledge, experience, initiative ability, physical demand, mental equipment, responsibility, working conditions and hazards of occupation.

Mr. Roth presented 15 factors on which job evaluation is based: Time required to learn a trade, time to adapt to conditions, scarcity of labor, difficulty in getting another job, educational requirements, prevailing rates of pay, accuracy and skill required, ingenuity, manufacturing hazard, honesty of effort, dirtiness in working conditions, health hazard, accident hazard, physical effort and monotony.

A definite percentage is allotted to each factor and the total in each case made up accordingly. The formula for applying the system is so clear, the speaker asserted, that his company is able to clear up questions in workers' minds by going over the analysis sheets with them.

In Mr. Roth's opinion, the best method for obtaining the correct number of skill points is to have some of the workmen discuss various factors with their foremen and superintendent and then to fix a final figure for each factor which will add up to a fair total.

♦

Theory Is Only a Guide In Creep of Metals

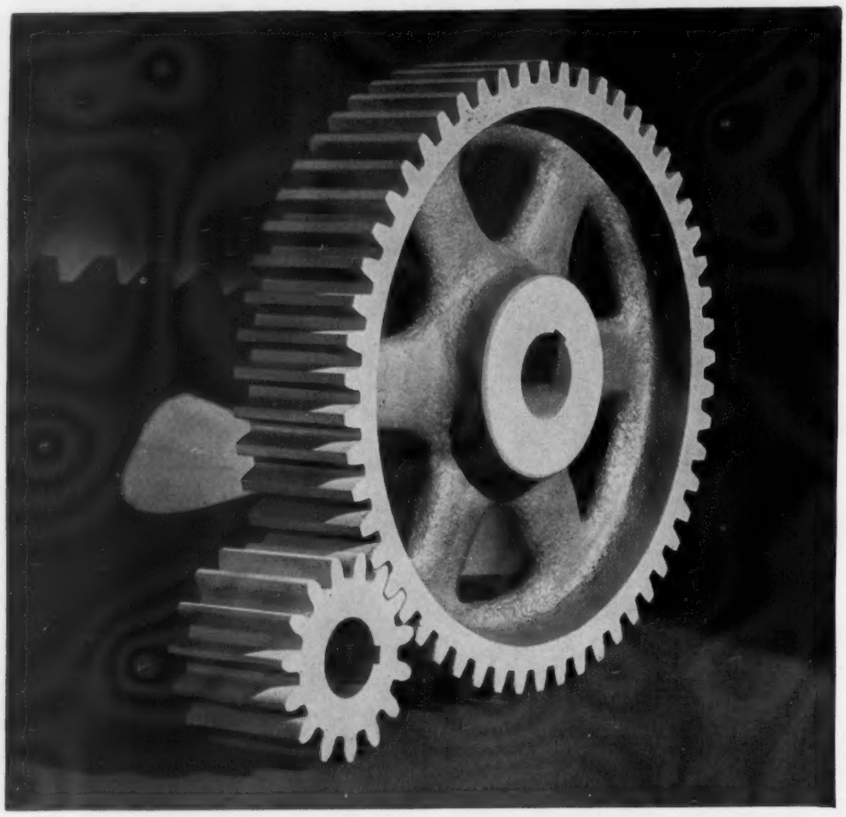
(*Concluded from Page* 46)

fects such as seams, laps and scabs are also minimized.

As the advantages of alloys have become better known, the average carbon content of steel in this strength range has dropped until most of the widely used steels are in the range of 0.15 to 0.20 per cent.

C. S. Barrett, department of metallurgy, Carnegie Institute of Technology, Pittsburgh, describing the structure of iron after drawing, swaging and elongation in tension, concludes a specific type of "grain fragmentation" occurs in swaged and drawn iron wires and tensile specimens, and doubtless in all iron rods, wires, and tubes formed by cold formation, and in grains from a diameter of 0.02-millimeter or smaller up to single crystals. The "elongated grains" seen in longitudinal sections of iron wires are frequently deformation bands. Deformation bands account for the failure of some investigators to get conclusive results regarding the slip directions and slip planes from investigations with tensile specimens.

J. T. Burwell, United States Steel Corp., Kearny, N. J., and J. Wulff, associate professor, metallurgy, Massachusetts Institute of Technology, Cambridge, Mass., discussed surface allotropic transformation in stainless steel introduced by polishing. The authors stated that the observable effects of metallographic polishing of austenitic stainless steel extend to a depth of about 4 x 10^{-5} centimeter below the polished surface. In the first 2.5 x 10^{-5} centimeter of this depth the metal is 90 per cent ferritic (body-centered) and beyond 4 x 10^{-5} centimeter it is wholly austenitic (face-centered). The working of the metal may well extend to depths lower than this but its magnitude is not sufficient to effect the transformation.



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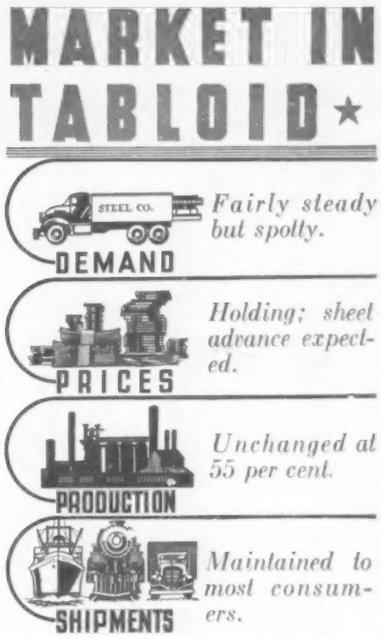
Activity In Steel Markets Irregular

Consumption Holding; Prices For Second Quarter Awaited



■ SPOTTY demand and strict adherence of consumers to close-range buying tend to detract somewhat from continued expectations of further expansion in steel business during coming weeks.

Reflecting only minor variations in new orders, the national steelmaking rate was unchanged at 55 per cent last week. This compares with 30.5 per cent a year ago, and 84 per cent in the 1937 period.

Despite sustained consumption of steel in most industries, buyers are not disposed to order ahead so long as producers are able to give relatively prompt delivery. This condition also reflects the belief among steel users that no sweeping price increases will be instituted on second quarter business.

Intimations of possible revisions in some products to correct special situations have been partially substantiated by the recent advance in barbed wire and the almost complete elimination of jobbers' allowances on galvanized sheets and formed products. An increase in some other sheet quotations, possibly through changes in differentials, is widely rumored.

New business from the automotive industry still is retarded by heavy tonnages bought late last year. As a result, incoming tonnage is expected to be comparatively light for at least another 30 days despite the fairly high rate of automobile assemblies.

Automobile Output 32 Per Cent Ahead of Last Year

Motorcar production last week dropped about 5000 units to 74,960. A year ago output declined to 56,977 units, while two years ago assemblies totaled 111,915. Last week, General Motors' production was steady at 34,765 units and Ford held at 16,600, but Chrysler dropped 3400 units to 16,360 and all others slipped from 8800 to 7235.

Old orders for rails and track accessories are an important support to steelmaking in some districts. Prospects for more active buying of freight cars and locomotives will depend largely upon the future trend of revenues. For the present only a moderate amount of equipment purchasing is in sight. Union Pacific has ordered 2000 underframes for freight cars it will build and is contemplating building an additional 300 flat cars. Maine Central is in the market for 600 freight cars and an old inquiry for 1000 cars for the Illinois Central has been revived.

New York Central is expected to order 35,000 tons or more of rails, plus accessories. Western Maryland has placed 2000 tons of rails.

Building Steel Orders Low; 8600-Ton Bridge Is Placed

Except for 8600 tons for the Rock Island-Davenport bridge across the Mississippi river, orders for fabricated structural steel are light. Inquiries for both shapes and concrete reinforcing bars have declined markedly from the volume late last year, when a large number of PWA projects were pending.

Seasonal factors are counted on to help turn finished steel demand upward in March, though the extent of the expected betterment may be affected by what changes are made in second quarter prices. Tin plate production normally expands at this time, and although business lately has been slow to increase, tin mill operations show another small gain to 55 per cent. As in many other products, buying is largely for immediate needs.

Heavier production of ingots in leading districts last week offset reductions in other centers. Gains of 1 point were recorded at both Pittsburgh and Chicago, the former being up to 48 per cent and the latter to 53.5. Youngstown rose 2 points to 47 and Wheeling 2 points to 68.

Buffalo operations were off 2.5 points to 32.5 per cent, Detroit dropped 3 points to 86 and Cleveland declined 2.5 points to 54. Unchanged districts were Birmingham at 83, Cincinnati at 55, St. Louis at 55, New England at 70 and eastern Pennsylvania at 37.

While scrap prices are easier in some areas, principal markets continue strong and forecast no immediate letdown in steelmaking. The scrap composite is unchanged at $14.96, while the finished steel composite holds at $56.50.

COMPOSITE MARKET AVERAGES

	Feb. 25	Feb. 18	Feb. 11	One Month Ago Jan., 1939	Three Months Ago Nov., 1938	One Year Ago Feb., 1938	Five Years Ago Feb., 1934
Iron and Steel	$36.38	$36.38	$36.36	$36.36	$36.39	$38.90	$31.30
Finished Steel	56.50	56.50	56.50	56.50	56.68	61.70	51.10
Steelworks Scrap..	14.96	14.96	14.79	14.77	14.58	13.54	11.72

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 25, 1939	Jan. 1939	Nov. 1938	Feb. 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.10	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Feb. 25, 1939	Jan. 1939	Nov. 1938	Feb. 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	90.25	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.60	$15.15	$14.15
Heavy melt. steel, No. 2, E. Pa.	13.25	13.25	12.75	13.25
Heavy melting steel, Chicago	14.25	13.75	13.85	12.15
Rails for rolling, Chicago	17.25	17.75	17.75	15.25
Railroad steel specialties, Chicago	16.25	16.00	16.05	14.85

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Chicago, Terre Haute	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt., Pitts.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.80; two-point cattle, 80-rod spool	$2.62
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(*Base, 3 to 25 tons*)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 1500-4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(*Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons*)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(*Gross Tons*)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅞-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers	
and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(*Gross Tons*)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 41/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.24
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$40.00
Joliet, E. Chicago	49.00
Birmingham, Ala.	40.00

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00; Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25; 20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do, less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05; Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do, 2% 12.50c

Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c

Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.61
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.33
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.20	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.60	3.58	7.57	6.17	5.92	7.30	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	..	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Feb. 23

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.45 5 0 0	$16.83	1 19 6
Basic bessemer	.....	15.98	1 17 6
Hematite, Phos. .03-.05	26.97 5 15 0*	.....	.....
Billets	$34.59 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.35 11 7 6	42.60	5 0 0
Standard rails	$44.56 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.90c to 2.05c	4 17 6 to 5 5 0
Structural shapes	2.09c 10 0 0	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.93c	7 10 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.42c	9 0 0
Bands and strips	2.77c 13 5 0	1.95c	5 0 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	.....	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.22	4 19 0(a)	$17.44	620.50	$16.22	480	$25.28 63
Basic bess. pig iron	21.69	4 12 6(a)	.....	...	.....	...	27.88(b) 69.50
Furnace coke	5.39	1 4 2	5.96	225	7.27	215	7.62 19
Billets	34.59	7 7 6	25.04	945	29.07	860	38.72 96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c 132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c 110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c 127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.12c	2,600	4.13c	2,750	6.66c 370
Plain wire	4.08c	19 10 0	1.92c	1,600	2.48c	1,650	3.11c 173
Bands and strips	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.00-13.50
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	14.00-14.50
Chicago, auto, no alloy	12.50-13.00
Chicago, No. 2 auto	11.50-12.00
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.00- 9.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	11.50-12.00
Granite City, R. R.	12.50-13.00
Granite City, No. 2	11.00-11.50
Los Angeles, No. 1	12.50-13.50
Los Angeles, No. 2	11.00-11.50
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.25-16.75
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.75-15.25
St. Louis, R. R.	12.50-13.00
St. Louis, No. 2	11.25-11.75
San Francisco, No. 1	12.00
Seattle, No. 1	12.00
Toronto, dirs. No. 1	9.75-10.25
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	13.00-13.50
Chicago, dealer	12.00-12.50
Cincinnati, del.	11.00-11.50
Cleveland	13.50-14.00
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	9.50-10.00
Valleys	14.25-14.75

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.75-15.25
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	8.00- 8.50
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.75-14.25
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	6.75- 7.25
Cincinnati, dealers	4.75- 5.25
Cleveland	7.50- 8.00
Detroit	5.75- 6.25
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.00- 4.00
Toronto, dealers	4.00- 4.50
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 8.00
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.00- 7.25
Cincinnati, dealers	3.50- 4.00
Cleveland	8.00- 8.50
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	5.00- 5.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.50-10.00
Toronto	4.00- 4.50

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.50- 8.00
Chicago	5.50- 6.00
Cincinnati, dealers	3.50- 4.00
Cleveland	8.00- 8.50
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	16.00-16.50

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	15.75-16.25
Eastern Pa.	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	13.75-14.25
Seattle	16.00

FROGS, SWITCHES

Chicago	14.00-14.50
St. Louis, cut	13.75-14.00

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.00- 9.50
Cincinnati, dealers	7.25-7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.00-13.50
New York	†8.50- 9.00
St. Louis	9.00- 9.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.00-12.50
Toronto, No. 1 dlr.	8.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	12.00-12.50
Cleveland	12.00-12.50
Detroit	10.00-10.50
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.75-19.25

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.50-18.00
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	18.00-18.50
Eastern Pa.	21.00-21.50
St. Louis	17.50-18.00

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†15.25-15.50
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.00-15.50
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.50-18.00
St. Louis, iron	14.50-15.00
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†10.50-10.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	13.00-13.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	14.50-15.00
Toronto, No. 1, mach., net	12.00-13.00

HEAVY CAST

Boston dist. break.	†10.00-10.25
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50
Los Ang., auto, net.	13.00-13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.00-13.50
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.50-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets, Strip

Sheet and Strip Prices, Pages 88, 89

Pittsburgh — Flat-rolled steel business is steady. Orders are well diversified but include no large automotive tonnages. Buying is still for immediate needs. Some interest is being shown in prices with the approach of the time for second quarter announcements. The general consensus is that while there may be some minor adjustments, large general revisions are unlikely. Galvanized sheet demand shows a slight seasonal pickup, with production near 60 per cent, almost as high as in the corresponding 1937 period. Output of common and full finished sheets is about 55 per cent.

Cleveland — Specifications have failed to expand to the degree predicted earlier this month, but bookings are near the January rate. March outlook is for gradual improvement in demand from miscellaneous sources and perhaps to greater extent from automotive interests. Considerable interest is evidenced in probable revision in prices for the second quarter, expected to be announced very soon. Specifications have been stimulated somewhat, following removal of discount on galvanized sheets.

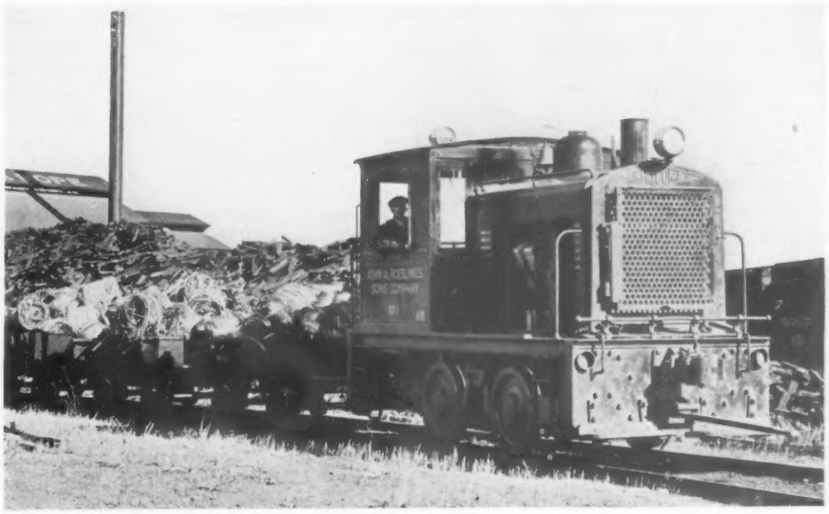
Chicago — Sheets and strip are quiet, with orders small and mostly for immediate needs. Requirements of miscellaneous users have improved moderately, but more substantial buying by the automotive industry still is awaited. The latter is ordering consistently but doing little or no forward buying. Demand from farm implement makers, which recently showed some improvement, makes no further gains.

Boston—With alloys and specialties holding relatively well, aggregate incoming cold strip volume has slackened, with indications February volume will fall under 70 per cent of the previous month's total. While there has been no general slump, new orders are lower as to tonnage, despite the fact general industrial and miscellaneous consumption appears to hold fairly well. Current new volume is well diversified and most specifications are for immediate delivery. Prices are generally firm.

New York — Elimination of functional discounts to jobbers on carlot orders of galvanized sheets and formed roofing has stimulated specifications against contracts somewhat. While the new schedules are effective at once, contracts extend through the remainder of the quarter. Further, jobbers have fair stocks on hand, consequently a real price test is not expected immediately. Some rumors persist, despite doubts by many, that a moderate increase in sheet prices may develop next quarter, through revisions in either base quotations or differentials. An announcement is looked for shortly. New business is spotty but heavier than a month ago, best demand lately coming from makers of household appliances.

Better demand for cold strip by producers of builders' hardware with scattered but steady orders from makers of automobile parts, barely maintains finishing operations at most plants. Production schedules are dependent on day-to-day business.

Philadelphia—Based on estimated scrap production a large auto body and frame maker now operating at 60 per cent expects a 15 per cent improvement in March. Another automotive interest which also does job stamping work is operating three full shifts, because of an increase



SWITCHING ECONOMY

This 30-ton Whitcomb Diesel-Mechanical locomotive is assigned to regular interdepartmental work in connection with Hot Mill operation at the plant of John A. Roebling's Sons at Roebling, N. J.

The complete locomotive line of Baldwin and Whitcomb permits us to offer unbiased recommendations as to the type of power best suited to your conditions. Without obligating you our engineers will survey your requirements and estimate the savings you can expect from Whitcomb power.

The Whitcomb Locomotive Company (Plant at Rochelle, Illinois). All Sales and Engineering by The Baldwin Locomotive Works, Paschall Post Office, Philadelphia, Penna.

Subsidiary of The Baldwin Locomotive Works

CHOOSE YOUR TYPE OF POWER
Gasoline or Diesel Mechanical Drive
Gasoline or Diesel Electric Drive
Electric Storage Battery
Electric Trolley

WHITCOMB LOCOMOTIVES
SUBSIDIARY OF THE BALDWIN LOCOMOTIVE WORKS

in government work. A maker of electrical switch gear, a large consumer of sheets and strip, expects to move operations back to the 1937 level within the next few weeks, due to an influx of utility orders. Reports persist that sheet prices and quantity differentials will be revised upward next quarter.

Buffalo—Sheet and strip demand is being sustained around recent levels, which producers do not consider any too favorable. New business gives little indication of early expansion, but hope is held of a general spring pickup among manufacturers. Mill output has receded slightly to around 45 to 50 per cent.

St. Louis — The sheet market is slow. Seasonal requirements are below expectations, particularly for heavier gages. Galvanized is moving well, providing the best activity at the moment.

Birmingham, Ala. — Sheets are in full production, both here and at Gadsden, to maintain schedules inaugurated several months ago. Mills declare the demand is rather evenly divided between manufacturers' and roofing sheets. Strip, with the exception of occasional manufacture of cotton ties, is at the usual low ebb.

Plates

Plate Prices, Page 88

Pittsburgh — Plate business is fairly active, supported to a large extent by requirements of miscellaneous consumers, oil companies and tank fabricators. Shipbuilding is providing some tonnage, although needs of barge builders currently are light. Railroad demand remains relatively dull.

Cleveland—Sellers note little variation in demand so far this month from the somewhat disappointing level prevailing through January. Outlook is clouded by failure of consumers to close on former inquiries, but sellers are confident considerable tonnage for miscellaneous ship repair work, tank, boiler and other industrial requirements will develop during March. Recent awards have been confined to small lots from specialty manufacturers. Largest pending project includes 1700 tons for steel pipe for waterworks improvement at Toledo, O.

Chicago — Plate demand continues active, with a better call noted from miscellaneous users. Business in heavy plates is spotty. Heavier inquiries for plates to be used in freight car building are anticipated.

Boston — Plate buying has slumped, miscellaneous orders for small lots accounting for most business. Shipyard releases are holding, but structural and boiler shops are placing few orders.

New York—Plate business is unchanged, and the month's bookings may fall short of January's. Railroad requirements are spotty and oil company releases generally have been disappointing. Shipyard specifications continue outstanding, though little new business is being placed. Closing on two tankers for Socony Vacuum Oil Co. is expected to be deferred for some time.

Philadelphia—Miscellaneous plate business is spotty, with few orders for more than carlots. Shipwork continues the largest outlet, but releases are irregular and not well distributed among producers. Midwestern plate mills are reported sharing in more ship business. Eastern railroads are not expanding their routine requirements, although they are said to be contemplating broader programs for equipment building and repairs. Export demand is quiet and less attractive because of further price easiness. Harrisburg, Pa., will require an estimated 10,000 tons of plates for water lines, supplementing the first unit, involving 1000 tons, which was placed with National Tube Co.

Birmingham, Ala.—Plate demand is maintained on a steady basis, largely as a result of shipbuilding and railroad business. Plates are being turned out on an estimate basis of approximately 80 per cent.

San Francisco — Little improvement is noted in demand for plates and practically all inquiries are limited to lots of less than 100 tons. Fallbrook, Calif., has rejected bids on 678 tons of 8 and 12-in. welded steel pipe and is expected to call for new bids soon. So far this year 11,448 tons have been placed, compared with 10,589 tons for the same period a year ago.

Plate Contracts Placed

1140 tons, barges for Central Barge Co., Chicago, to Bethlehem Steel Co., Bethlehem, Pa.

Plate Contracts Pending

7375 tons, plates, sheets and strip, for battleship, Alabama-Norfolk navy yard; bids March 2, also 775 tons of shapes and 200 tons of bars and strip, to bureau of supplies and accounts navy department which also closes March 9 on 600 tons of I-beams for same ship.

678 tons, 8 to 12-inch welded or lap-welded or tubing, Fallbrook, Calif.; bids rejected and new bids will be called soon.

400 tons, elevated tank, Tucson, Ariz.; Chicago Bridge & Iron Works low bidder on 1,000,000, 750,000 or 500,000-gallon tank.

Bars

Bar Prices, Page 88

Cleveland — Demand for commercial and alloy steel bars has failed to develop as expected earlier this month. Specifications from farm equipment concerns have improved only moderately, although it is still somewhat early to make any accurate prediction of probable spring demand. Steel forging concerns and cold bar finishers are maintaining operations substantially unchanged from the January level. Inventories of miscellaneous consumers are low, as indicated by requests for prompt deliveries on most specifications. Mill operations are unchanged with prompt deliveries generally available.

Chicago—Merchant bar demand is described as quite good, with favorable prospects for additional small betterment in the near future. Miscellaneous business has improved slightly, but automotive demand is unchanged. The latter has been consistent but conservative. Needs of industrial truck and tractor builders are sustained. Business from farm equipment interests is variable, with a slight letdown reported by some mills lately.

Boston — Except for 200 tons of nickel steel bars for chainmaking at the Boston navy yard, demand for bars is light and somewhat irregular. A fair volume of buying is being done by the district arsenals and shipyard releases are steady. Alloys are making relatively the best showing and prices are steady.

New York—Except for demand for special alloy bars for government shops, airplane manufacturers and to some extent machine tool builders, the market is rather listless. This is particularly true of plain carbon bars. Jobbers are specifying slowly, and while bolt and nut makers are more active, this has yet to be reflected to any marked extent in their specifications.

Philadelphia—Cold-drawn bars and shafting are moving well to textile equipment makers, who are operating close to capacity. Free turning bars also are in fair demand in some directions, but activity in the screw machine trade generally is spotty. Carbon bars are slightly more active, although jobbers are not contributing to present volume.

Buffalo — Bar orders are off slightly, but output holds at a fairly good level. Backlogs are scant. Demand from miscellaneous consumers

continues the principal source of business.

Birmingham, Ala. — Merchant bars and concrete reinforcing bars both are commanding a steady and consistent market. Producers are distinctly optimistic over prospects for continued high production. Highway construction is accounting for much of the reinforcing bar business.

Pipe

Pipe Prices, Page 89

Pittsburgh — Pipe business this month is slightly ahead of January volume. Better demand has appeared in all classes of pressure tubing, including a small gain in railroad orders for boiler tubes. Automotive buying of mechanical tubing is up slightly, although demand still is hand-to-mouth with immediate delivery required. Business in oil country goods is up seasonally, and standard pipe demand is unchanged. Best call for the latter is for new construction work in the East. Tubular goods prices are firm, with little change in immediate prospect.

Cleveland—Jobber shipments of steel pipe continue at about the January daily rate, but a moderate pickup is looked for in March. Cast pipe inquiries from small municipalities are somewhat below expectations, but here also the approach of more favorable weather is counted on to stimulate the market.

Chicago — Cast pipe inquiries for spring delivery are slow to appear. WPA orders still give some support to the market, but PWA requirements in the way of new business are about exhausted. Several large projects are pending, including 1500 tons for Milwaukee, 673 tons for Lincoln park, Chicago, and 203 tons of fittings for city of Chicago.

New York — While jobbers have experienced better business so far this month than in January, this situation has not been reflected in mill bookings. Replacement of resellers' stocks will be necessary soon. Large orders are in prospect with the approach of the spring building season. These include requirements for the Hunter college buildings and a new building under construction at Rockefeller Center, here.

Birmingham, Ala. — Pipe bookings have shown some improvement during the current month, especially utility bookings, some worthwhile tonnage going to California. Lettings that have been satisfactory in the aggregate, but small individually, materialized earlier in the month.

San Francisco—The only cast iron pipe letting of size went to Pacific States Cast Iron Pipe Co., 192 tons for Lewiston, Idaho. Other pending business includes 143 tons for Portland, Oreg. Awards aggregated 251 tons and brought the total to date to 5210 tons, compared with 4232 tons for the corresponding period in 1938.

Seattle — Several municipal projects are under consideration. Seattle plans a 16-inch extension in Canada Drive S. W., about 150 tons. Lewiston, Idaho, has placed 192 tons of 6, 8 and 10-inch with Pacific States Cast Iron Pipe Co., Provo, Utah.

Cast Pipe Placed

300 tons, 24-inch and under, procurement division, treasury department, New York, to Donaldson Iron Co., Emaus, Pa.

192 tons, 6 to 10-inch, Lewiston, Idaho, to Pacific States Cast Iron Pipe Co., Provo, Utah.

Steel Pipe Placed

8500 tons, second unit, water line, Beth-

Makes right angle turns, stacks freight to the roof.

CLARK CARLOADER
cuts handling costs!

A machine that lifts, carries and tiers 3500-lb. loads as high as nine feet. It cuts net cost by reducing the cost of handling freight, keeping parts and materials moving in production.

The most expensive way to handle heavy loads

Write for booklet "The Clark Carloader Method."

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lehem, Pa., to Lock-Joint Pipe Co., Ampere, N. J.

1035 tons, first section, 42-inch water line, Harrisburg, Pa., to National Tube Co., Pittsburgh.

Cast Pipe Pending

1500 tons, Milwaukee; bids closed.

673 tons, Lincoln park, Chicago; George D. Hardin, Chicago, low for general contract.

203 tons, fittings for 3 to 23-inch pipe, Chicago; bids March 1.

368 tons, 4 and 6-inch, Mesa, Ariz.; bids opened.

186 tons, 2 to 8-inch, Los Angeles county, California, specification 9727; United States Pipe & Foundry Co., Burlington, N. J., low.

150 tons, 16-inch class 150 centrifugal, for Canada Drive, S. W., Seattle, extension; bids soon.

Wire

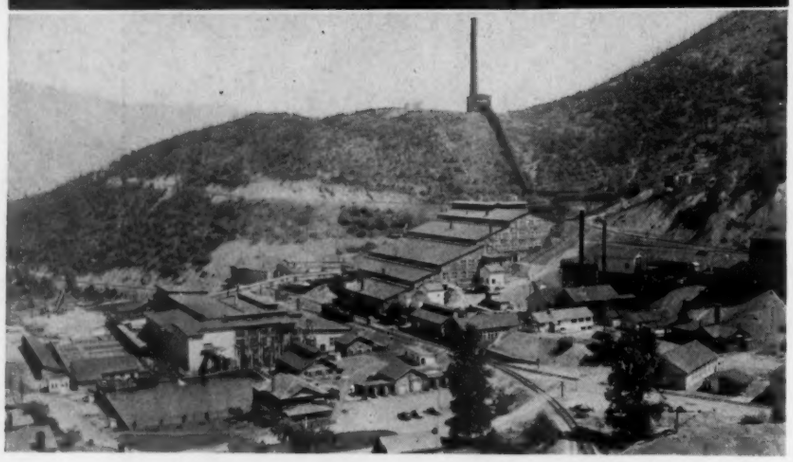
Wire Prices, Page 89

Cleveland — An advance of $2 a ton in galvanized barbed wire establishes new quotations on a per-spool basis and divorces this commodity from the former tieup with nail prices. The new market on standard 12.5 gage two-point hog barbed wire is $2.80 per 80-rod spool and $2.62 for cattle barbed wire. Other styles are up in proportion. Twisted barbless wire also has been advanced $2 a ton to $3.30 per 100 pounds. Specifications for manufacturers' wire are moderately below January levels. Demand from automotive interests is off seasonally, with needs of other users unchanged. Business in merchant products in farm centers is slow to improve.

New York—Demand for wire products has slackened slightly. Manufacturers' wire is steady with screw stock buying steady. Practically all incoming business is for prompt delivery. Prices are generally steady, although weakness continues in wire for building construction. Demand for merchant products is slack, due to heavy purchases late last year.

Birmingham, Ala. — Wire products are holding to the approximately 80 per cent schedule effective over the past few weeks, with distribution of output going largely into consumer trades, although some wire products are being restocked by distributors and jobbers.

10th ANNIVERSARY



BUNKER HILL COMPLETES 10 YEARS OF UNINTERRUPTED OPERATION

With the start of 1939 the Bunker Hill zinc plant completes ten years of uninterrupted operation. Bunker Hill pioneered the production of 99.99+% zinc and made it available to industry three years prior to the appearance of any comparable metal. New achievements in many industries were made possible; these ranged from practically revolutionary changes in the physical properties and applications of die casting, to increased flexibility and corrosion resistance of zinc coatings on galvanized strip and wire.

The extent of these changes can be demonstrated, for example, by the enormous increase in the use of zinc base die castings. In 1928 the die casting industry consumed 30,000 tons of slab zinc. Since Bunker Hill showed the way to the production of four-nine zinc in commercial quantities, the consumption of slab zinc by die casters rose to 88,000 tons in 1937 —the last figure available. In view of these achievements, rarely duplicated in the metal industry, the 10th anniversary of Bunker Hill is well worth noting.

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BUNKER HILL ZINC

Rails, Cars

Track Material Prices, Page 89

New York Central has issued an inquiry for rails, bids to be opened under the Clayton act March 3. No definite tonnage is specified but it is expected 35,000 to 50,000 tons will be bought, plus accessories. This tonnage is in addition to about 28,000 tons placed last fall. Accessories on this inquiry are expected to total 3500 to 5000 tons.

Union Pacific has awarded 1500 steel underframes to Mount Vernon Car Mfg. Co., Mount Vernon, Ill., and 500 to Pacific Car & Foundry Co., Seattle, for cars to be built in its own shops.

Maine Central, recently in the market for 150 gondolas, is understood to be inquiring tentatively on 500 box cars and 100 hopper cars.

Navy department is inquiring for two 50-ton flat cars and two 50-ton box cars. This follows orders for four similar cars placed recently.

Car Orders Placed

Lehigh & New England, 100 hopper cars, reported to Bethlehem Steel Co., Bethlehem, Pa.

Union Pacific, 1500 steel underframes to Mount Vernon Car Mfg. Co., Mount Vernon, Ill., and 500 to Pacific Car & Foundry Co., Seattle.

United States navy, two 50-ton box cars, to Greenville Steel Car Co., Greenville, Pa.; in addition to two 50-ton flat cars recently placed with the Magor Car Corp., Passaic, N. J.

Rail Orders Placed

Chicago & Eastern Illinois, 5000 tons rails; 3750 tons to Carnegie-Illinois Steel Corp., 1250 tons to Inland Steel Co., Chicago; buying of an additional 5000 tons is under consideration.

Western Maryland, 2000 tons of rails, 1000 tons to Carnegie-Illinois Steel Corp., Pittsburgh, and 1000 to Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Pending

Maine Central, recently noted as inquiring for 150 hopper cars, is understood also to be taking tentative figures on 500 box cars and 100 hopper cars.

United States navy, two 50-ton box cars and two 50-ton flat cars, bids asked; in addition to four similar type cars placed recently.

Rail Orders Pending

New York Central, substantial tonnage of rails and accessories, bids March 3; estimated rail requirements will be 35,000 to 50,000 tons, plus several thousand tons of accessories.

Buses Booked

Kenworth Motor Truck Corp., Seattle, and Pacific Car & Foundry Co., Seattle, ten motor passenger coaches, for North Coast Transportation Co., Seattle.

Shapes

Structural Shape Prices, Page 88

Pittsburgh — Structural shapes show little change in volume here. Projects and awards are lighter than previously this year.

Chicago—One of the largest structural jobs in recent years here has been booked by American Bridge Co., Chicago, from the city of Rock Island, Ill., for the Rock Island-Davenport toll bridge across the Mississippi river, which will require approximately 8600 tons of angles, beams and narrow plates in the superstructure. The steel will be produced at Gary works, Carnegie-Illinois Steel Corp., it is understood.

Boston — Structural awards are heavier, approximating 2500 tons, led by 1440 tons for a trade school at Springfield, Mass., going to Lehigh Structural Steel Co., Allentown, Pa. Bridge needs are light, 240 tons being placed for I-beam and plate girder spans, Vermont, with several hundred tons pending for small structures, Maine and Vermont. Most tonnage continues to be placed with shops outside the New England district, including 525 tons for state training school buildings, Southbury, Conn., placed through a Massachusetts contractor.

Philadelphia—Award of 2500 tons for the new Du Pont plant, Seaford, Del., to Bethlehem Steel Co., Bethlehem, Pa., features an otherwise dull market. Other industrial work includes 1500 tons for six buildings, Celanese Corp., Narrows, Va., on which bids are due March 7 and 200 tons plant addition for the Stegemeier Brewing Co., Wilkesbarre, Pa. Several bridge jobs remain in the offing. The state of Pennsylvania is expected to curtail

Shape Awards Compared

	Tons
Week ended Feb. 25	27,602
Week ended Feb. 18	9,961
Week ended Feb. 11	10,385
This week, 1938	8,409
Weekly average, year, 1938	21,566
Weekly average, 1939	28,435
Weekly average, January	32,362
Total to date, 1938	112,148
Total to date, 1939	199,042

Includes awards of 100 tons or more.

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FORGING COSTS go down in Erie Hammer-equipped shops because Eries are built with the weight and power necessary for high speed production of uniformly accurate forged parts . . . takes more than a "good" hammer to turn out continuously first quality forgings to uniformly close limits . . . to minimize expensive finishing . . . Erie's 36 years of experience enables you to choose steam and board drop hammers that fit your forging requirement . . Bulletins 325 and 328 give full details. Write for your copies.
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its building program under the new administration.

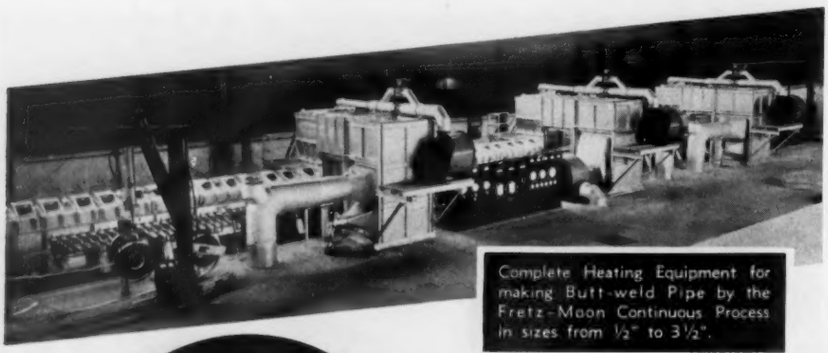
Buffalo—School projects continue to dominate, as a few more such jobs were put up for bids in addition to approximately fifteen that have been announced since the start of the month.

New York — Structural contracts are slack, with the award of approximately 2000 tons for a Queens hospital outstanding. New inquiry is up slightly but confined to more numerous medium sized projects with a few large tonnage jobs up for estimates. On the whole most of the larger shops still have substantial backlogs. Largest pending inquiry includes 3500 tons for the Pratt & Whitney Co.'s buildings, Hartford, Conn.

Cleveland — Private work continues to lag behind earlier predictions, but some fabricators are confident that work of this type will expand somewhat during March. Bids went in late last week on 1600 tons for the easterly extension to the Main street bridge, Cleveland, and 440 tons for a trade school at Toledo. Considerable tonnage of piling is still pending for the Big creek intercepting sewer and Carter road bridge projects here. Fabricated prices continue weak, with backlogs of most fabricators at discouragingly low levels.

San Francisco—Structural awards were the second largest for any week so far this year and aggregated 7771 tons, bringing the total for the year to 24,769 tons, compared with 10,014 tons for the corresponding period in 1939. Pacific Car & Foundry Co. secured 2561 tons for units 3, 4 and 11 of the Lake Washington bridge, Seattle.

Seattle — Public works projects predominate, private construction continuing nominal. More than 800 tons are involved in state bridges in Washington and Oregon, general contracts placed.



Complete Heating Equipment for making Butt-weld Pipe by the Fretz-Moon Continuous Process in sizes from ½" to 3½".

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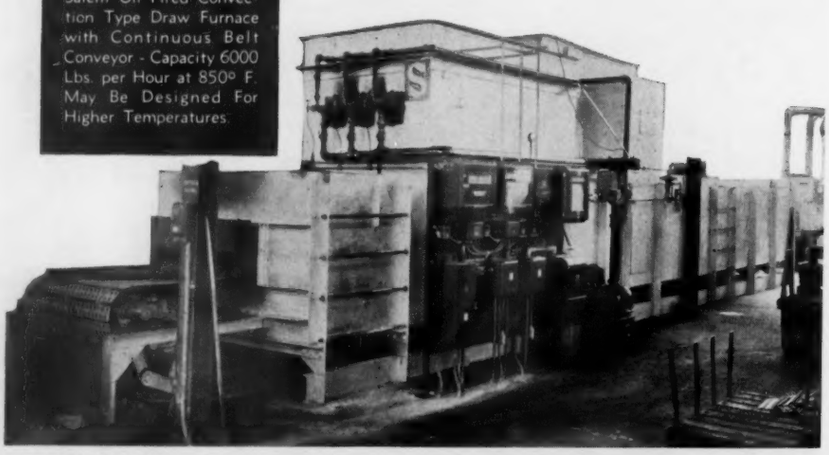
Salem experience on furnaces for Heat Treating, Billet Heating, Forging, Brazing, Pipe Making and "Salem" Circular Soaking Pits offers much that may help to meet specific conditions in your own work. Asking to have a qualified representative talk with you entails no obligation.

Salem Oil-Fired Convection Type Draw Furnace with Continuous Belt Conveyor - Capacity 6000 Lbs. per Hour at 850° F. May Be Designed For Higher Temperatures.



SALEM, OHIO,—CHICAGO - DETROIT - NEW YORK - PITTSBURGH - LONDON - PARIS - BERLIN - WELLAND, ONT.

SALEM ENGINEERING COMPANY

Shape Contracts Placed

8600 tons, superstructure, Rock Island-Davenport toll bridge over Mississippi river, by city of Rock Island, Ill., to American Bridge Co., Chicago; substructure awarded McCarthy Improvement Co., Davenport, Iowa, involves unstated tonnage concrete bars.

2561 tons, units 3, 4 and 11, Lake Washington bridge, Seattle, to Pacific Car & Foundry Co., Seattle.

2500 tons, plant, E. I. du Pont de Nemours & Co., Seaford, Del., to Bethlehem Steel Co., Bethlehem, Pa.

1440 tons, trade school, Springfield, Mass., to Lehigh Structural Steel Co., Allentown, Pa.; George A. Fuller Co., Boston, general contractor.

950 tons, Choctawatchee bay bridge, Walton county, Florida, for Walton county bridge authority, to Bethlehem Steel Co., Bethlehem, Pa.

925 tons, girder viaducts and bridges, Bingham & Garfield railroad, Magna, Utah, to American Bridge Co., Pittsburgh.

675 tons, bridge repairs, Western Maryland railroad, Cumberland and Hagerstown, Md., awarded as follows: 365 tons to American Bridge Co., Pittsburgh, and 310 tons to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, over-crossing at Albany, Linn county, Oregon, to Poole & McGonigle, Portland, Oreg.

525 tons, school and hospital, group D buildings, state training school, Southbury, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.

500 tons, approaches, Piscataqua bridge, Portsmouth, N. H., for Maine-New Hampshire bridge authority, to Bethlehem Steel Co., Bethlehem, Pa.

400 tons, piling, department of purchase, New York city, to Carnegie-Illinois Steel Corp., Pittsburgh.

375 tons, high school, Frederick, Md., to Rosslyn Steel & Cement Co.

375 tons, Tremont health center, Bronx, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

360 tons, power house, state prison, Green Haven, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.

350 tons, Nineteenth avenue garage, Brooklyn, N. Y., to American Bridge Co., Pittsburgh.

350 tons, high school, Billings, Mont., to Bethlehem Steel Co., Seattle.

350 tons, senior high school, Steubenville, O., to Bethlehem Steel Co., Bethlehem, Pa.

325 tons, office-jail building, Broome county, New York, to Bethlehem Steel Co., Bethlehem, Pa.

310 tons, Deer Creek aqueduct, Salt Lake City, Utah, by bureau of reclamation, Denver, to Structural Steel & Forge Co., Salt Lake City, Utah.

300 tons, food terminal, Denver, to Midwest Steel & Iron Works Co., Denver.

300 tons, 15 beam spans, state procurement office, treasury department, Oklahoma City, Okla., to Capitol Steel & Iron Co., Oklahoma City.

285 tons, service building, F. & R. Lazarus & Co., Columbus, O., to C. E. Morris Co., Columbus, O.

280 tons, deck plate girder span, Norfolk & Western railroad, Prilliman, Va., to Virginia Bridge Co., Roanoke, Va.

260 tons, bridges, FAP-1008-C, Kimble county, and FAP-FAGM-423H, Smith county, Texas, to Austin Bros., Dallas.

250 tons, state highway bridges, SH-1963, Glen, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, high school building, Zion, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

240 tons, Crafts and Cassville bridges, 2-span I-beam, 148-foot, and 2-span plate girder, 207.2-foot, Bradford, Vt., to American Bridge Co., Pittsburgh; Hagan-Thibodeau Construction Co. Inc., Wolfeboro, N. H., general contractor, bids Feb. 10; H. E. Sargent, commissioner of highways, Montpelier.

225 tons, school, Ossining, N. Y., to Lehigh Structural Steel Co., Allentown, Pa.; through William A. BerBusse Inc., White Plains, N. Y.

215 tons, bridge 1663-C, Wheeler-Treutlen counties, Georgia, to Nashville Bridge Co., Nashville, Tenn.

215 tons, scaffolds, Cathedral of St. John the Divine, New York, to Bethlehem Fabricators Inc., Bethlehem, Pa.

205 tons, bridge FAP-1007-A, Williamson county, Texas, to Mosher Steel Co., Dallas.

205 tons, bridge 1269-F-336-B, Noxubee county, Texas, to Jones & Laughlin Steel Corp., Pittsburgh.

196 tons, bridges for United States bureau of public roads, Tehama county, Calif., to Judson-Pacific Co., San Francisco.

190 tons, state highway bridge, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

175 tons, building, Home for Incurables, Baltimore, to Baltimore Steel Co., Baltimore.

160 tons, grade school, Croton-on-Hudson, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

160 tons, army gymnasium, Fort Warren, Wyo., to Des Moines Steel Co., Des Moines, Ia., pro. 70.

150 tons, supply store house, specification 8742, Mare Island, Calif., navy yard, to Judson-Pacific Co., San Francisco.

150 tons, incinerator, New Rochelle, N. Y., to Levine Iron Works, New York.

150 tons, transfer bridge, Brooklyn eastern district terminal, Brooklyn, N. Y., to American Bridge Co., Pittsburgh.

130 tons, state bridge, route 60, Lake Zurich, Ill., to American Bridge Co., Pittsburgh.

125 tons, bridge, Ironton, O., to Meehan Steel Products Co., Ironton.

110 tons, veterans' hospital buildings, Dallas, Tex., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.; Robert E. McKee, El Paso, Tex., engineer and contractor.

105 tons, bridge WPA-CWR-183, Comanche county, Texas, to Mosher Steel Co., Dallas.

100 tons, institutional buildings, federal project, Dallas, Tex., to Mosher Steel Co., Dallas, Tex.; Dolph-Bateson Construction Co., Dallas, general contractor.

Shape Contracts Pending

6000 tons, Delaware aqueduct, contract 318, Dutchess, Ulster and Orange counties, New York; bids March 2.

1500 tons, six buildings, Celanese Corp., Narrows, Va.; bids March 7.

1225 tons, sewer, sections 102 and 103, Chelsea-Everett, Mass.

1200 tons, power houses for Pacific Gas & Electric Co., San Francisco; bids opened.

832 tons, over-crossing near Turlock, Stanislaus county, Calif; general contract to Union Paving Co., 310 California St., San Francisco.

725 tons, United States bureau of reclamation, Denver; includes 500 tons steel lattice trash racks, various western dams; 125 tons, small bridges in Colorado; and 100 tons, 123 pedestrian underpasses.

725 tons, overpass, Cottage Farm bridge, Cambridge, Mass.

600 tons, building, Mountain States Telephone Co., Salt Lake City, Utah.

600 tons, building over Summit house, Manitou & Peak railroad, Pikes Peak, Colo.

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DEEP DRAWN SHELLS AND SHAPES

Behind the Scenes with STEEL

Plane Talk

■ "We were very much interested," writes the Potter & Johnston Machine Co., "in the article pertaining to aviation in your Feb. 13 issue". And so, also, were dozens of other machinery, equipment and parts companies. As you have probably noticed too, STEEL has been up in the air lately, and over coming weeks we may even take a crack at some outside loops and dead stick landings in our job of keeping you informed on this fascinating matter of aviation. This week, on page 29, STEEL gives you a whirl through the Canadian airplants and some more pertinent dope on business placed in this country.

What Depression?

■ The very word *aviation* gives most of us a thrill, and although much of the hullabaloo recently has been in connection with national defense, do you realize how the industry is growing by leaps and bounds? Do you know, for instance, that in the last five years the dollar production of aircraft and parts increased more than four times? In 1934 there were 13,000 factory workers in the aviation industry—today there are more than 40,000. Our exports in 1929 were only $9,000,000—last year they were close to $70,000,000. And from what we can gather, you ain't seen nothin' yet.

Contact!

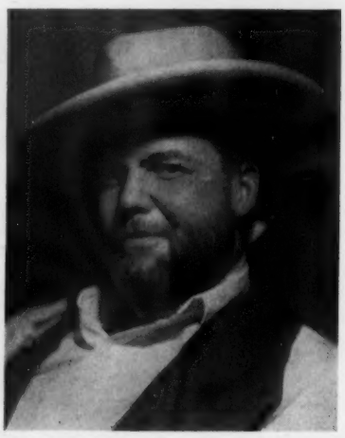
■ Coming down out of the air for a moment, we find ourselves just a little bit irritated at the way business has been stumbling along for the past few weeks. There is something lethargic about the situation, and for what reason? There seems to be the same old fear hanging over our heads—fear of what's around the corner—fear of the unknown. We've all been poised on the starting line long enough. Why doesn't some one crack the gun? We're still willing to bet all we have that the boogie man won't get us.

In the Big House

■ Out in Bismarck, North Dakota comes a letter from the State Penitentiary telling us how much they enjoy their subscription to STEEL. It seems the State Tag plant is in the big house and every copy is routed to nearly everyone working there. They especially like Mirrors of Motordom—and who doesn't?

Yippee!

■ Dispatches from San Francisco describing the wild west days being reenacted by all inhabitants apparently brought out the competitive spirit of Pittsburgh. From the home of steel, comes this photo of a leading citizen who looks like a far better bet



for Jesse James than Tyrone Power. We might even run a contest on who is it?—but we're afraid that some of the advertising space peddlers might detect that under this beard hides the jovial countenance of R. Manning Gibbs, substantial adv. mgr. of Jones & Laughlin Steel Corp. Details on the beard may be obtained by writing this address or consulting Mormon Temple, Salt Lake City. You don't believe it? Just look at the love light in them eyes!

—SHRDLU

—The Market Week—

600 tons, bridge, Cottage Farm road, Cambridge, Mass.; bids March 2.

500 tons, jib crane for Mare Island and Bremerton navy yards, specification 9003; Industrial Brown Hoist Co. submitted only bid on cranes for above yards and Boston and Philadelphia navy yards.

500 tons, 50-ton jib boom crane for Puget Sound navy yard, Wash.; Star Iron & Steel Co., Tacoma, sole bidder.

490 tons, beam spans, Clifton, N. J.; Eldora Construction Co., Newark, low.

460 tons, transit shed for Pier 40, Seattle; bids March 6.

450 tons, fourth section, Chicago subway; John Marsch Inc., Chicago, low bidder on general contract.

450 tons, substation, specification 1187-D, bureau of reclamation, Boulder City, Colo.

440 tons, trade school, Toledo, O.; bids Feb. 24.

400 tons, school, Nunda, N. Y.; bids March 2.

375 tons, juvenile court building, Washington.

353 tons, bridge, Quitman, Miss.; bids in.

350 tons, highway bridge, for Westchester Park commission, Yonkers, N. Y.

325 tons, State Normal school, Fredonia, N. Y.; bids March 30.

300 tons, high school, Hamburg, N. Y.; bids March 10.

300 tons, underpass, Norfolk & Western railroad, Norfolk, Va.

300 tons, memorial, Thomas Jefferson Memorial commission, Washington.

250 tons, fifth section, Chicago subway; bids March 9.

230 tons, Market street overpass, Shreveport, La.

220 tons, central heating plant, war department, Chanute field, Rantoul, Ill., earlier estimated at 500 tons; bids Feb. 28.

214 tons, in addition to 46 tons plates, under-crossing at Chapman street, Los Angeles; general contract to United Concrete Pipe Corp., 1307 West 208th St., Los Angeles, at $117,822.

200 tons, shoring material, George H. Flinn Corp., Brooklyn, N. Y.

200 tons, Fillmore, N. Y., school.

200 tons, bridges, Chicago, Milwaukee, St. Paul & Pacific railroad, at Rathbun and Blakesburg, Iowa.

200 tons, community recreation building, Sault Ste. Marie, Mich.; December bids rejected, new bids close Feb. 27; John Chubb, Chicago, architect.

200 tons, addition, Stegemeier Brewing Co., Wilkesbarre, Pa.

189 tons, steel girder under-crossing, Spokane county, Washington; bids rejected and new bids to be opened March 4.

165 tons, widening of Fourteenth street viaduct, for city and county of Denver, Colo.

150 tons, armory, Millville, N. J., for United States government.

140 tons, building, Industrial Silica Co., Phalanx, O.; bids in.

125 tons, school, East Bloomfield, N. Y.; Swartout & Rawley, Rochester, N. Y., low.

115 tons, shop and laboratory, United States bureau of mines, Pittsburgh.

114 tons, over-crossing at Western Pacific tracks, Oroville, Calif.; bids Feb. 27 by city.

114 tons, building addition Sand Point, Seattle, air station; bids to Puget Sound navy yard, March 6.

110 tons, bridge, Sylvatus, Va.; bids Feb. 28, state highway department.

105 tons, under-crossing of Southern

Pacific tracks, Riverside county, California; bids March 2.

Unstated, radial gate for Roza canal project, Washington state; bids to Denver, March 2; Spec. 1192-D.

Reinforcing

Reinforcing Bar Prices, Page 89

New York—Award of 375 tons for a section of the East Side drive, Manhattan, is outstanding, Jones & Laughlin Steel Corp., to furnish the steel. Small lot buying has held well, but tonnage demand is slack with the exception of the Fleetwood viaduct taking 700 tons, Westchester county, on which bids are in.

Pittsburgh—Reinforcing bar tonnages are light, with little new activity. An increasing number of small private jobs follows dwindling of public projects. The price situation is stronger at the moment in some localities but there is no indication the situation has cleared generally.

Cleveland — Reinforcing bar awards remain restricted to small miscellaneous tonnages with but few exceptions. Private work continues disappointing and no improvement is indicated for the immediate future. Galier Bros. Co., Cleveland, is low on a storm sewer at Steubenville, O., involving 300 tons. A number of schools are scheduled to come up for bids in the near future, but individual tonnages involved are relatively small. Fabricated prices continue weak.

Chicago—There are fewer jobs pending, but total tonnage is about the same. Bar producers see business prospects good, with the market expected to be well maintained. Western avenue bridge, Chicago, will take 500 tons. Fifth section of the Chicago subway will require approximately 3700 tons.

Philadelphia—Few concrete bar jobs of any consequence have been reported. Plans for the Harrisburg-Pittsburgh super-highway bridges which were due last week have been delayed a month or more, due to changes in design. Prices continue weak despite reports of a stronger market.

San Francisco — Reinforcing bar lettings were the largest for any week so far this year and totaled 7958 tons, bringing the year's aggregate to 30,731 tons, compared with 18,912 tons for the same period last year. Bethlehem Steel Co. took 1679 tons and 400 tons, respectively, for barracks at Hickam Field and Schofield Barracks, T. H. Soule Steel Co. booked 993 tons for foundations for the Mare Island navy yard machine shop. The total new business exceeds 4000 tons while business up for figures or pending is in excess of 14,000 tons.

Seattle—Tonnages of reinforcing bars pending in this area exceed 11,000 tons but new business of importance is developing slowly. Bureau of Reclamation opened bids at Denver Feb. 16 for furnishing more than 2500 tons of round and deformed bars for the Coulee project. Award is pending. No announcement has been made regarding award of 1263 tons for the Roza project, Washington state, bids opened by the bureau Jan. 9.

Concrete Bars Compared

	Tons
Week ended Feb. 25	6,940
Week ended Feb. 18	4,302
Week ended Feb. 11	10,132
This week, 1938	4,410
Weekly average, year, 1938	6,959
Weekly average, 1939	13,078
Weekly average, January	14,736
Total to date, 1938	46,616
Total to date, 1939	91,543

Includes awards of 100 tons or more.

Reinforcing Steel Awards

1679 tons, 3200-men barracks, Hickam Field, T. H., to Bethlehem Steel Co., San Francisco.

993 tons, foundations for machine shop, specification 8043, Mare Island, Calif., navy yard, to Soule Steel Co., San Francisco.

550 tons, bars and shapes, federal hos-

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pital buildings, Dallas, Tex., to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla., and Texas Steel Co., Fort Worth, Texas; Robert E. McKee, contractor and engineer, El Paso, Tex.

500 tons, University of Arkansas, Fayetteville, Ark., to Sheffield Steel Corp., Kansas City, Mo.; F. T. Smith, contractor.

400 tons, barracks A and B, Schofield Barracks, T. H., to Bethlehem Steel Co., San Francisco.

350 tons, Marine Drive apartment building, Chicago, to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; Oman & Lilenthal, contractors.

275 tons, bars and shapes, Robert Mills Manor housing project, Charlestown, S. C., to Savannah Products Co., Savannah, Ga., and Bethlehem Steel Co., Bethlehem, Pa.; Artley Co., Savannah, general contractors.

250 tons, power house, Lexington, Nebr., to Sheffield Steel Corp., Kansas City, Mo., through Ceco Steel Products Co., Kansas City.

200 tons, high school, Coachella, Calif., to unnamed interest.

190 tons, bridge in Snohomish county, Washington, to unnamed interest.

185 tons, elementary school, Davenport, Iowa, to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; T. S. Willis, contractor.

168 tons, foundations, assembly shop, naval air base, Alameda, Calif., specification 8609, to Gilmore Fabricators Inc., San Francisco.

160 tons, pump house and administration building, Waterloo, Iowa, to Laclede Steel Co., St. Louis.

150 tons, high school buildings, Phoenix, Ariz., to unnamed interest.

150 tons, junior college gymnasium, Ventura, Calif., to unnamed interest.

125 tons, city hall, Boone, Iowa, to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.; Lippert Construction Co., contractor.

115 tons, bureau of reclamation, pro. 46409-A, to Youngstown Sheet & Tube Co., Youngstown, O.

100 tons, cancer institute, Madison, Wis., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.; Maurice Schumacher, contractor.

100 tons, Eagle Point reservoir, Dubuque, Iowa, to Calumet Steel Co., Chicago; Anton Zwack Co., contractor.

100 tons, high school, Rahway, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; Auf-Der-Heide-Aragona Inc., contractor.

100 tons, addition to first avenue school, Arcadia, Calif., to unnamed interest.

100 tons, laboratory, Standard Oil Co., Richmond, Calif., to Gilmore Fabricators Inc., San Francisco.

Reinforcing Steel Pending

3700 tons, fifth section, Chicago subway; bids March 9.

2750 tons, fourth section, Chicago subway; John Marsch Inc., Chicago, low.

900 tons, Delaware aqueduct, contract 318, Dutchess, Ulster and Orange counties, New York; bids March 2.

749 tons, three viaducts in connection with Golden Gate bridge, San Francisco; general contract to Union Paving Co., 310 California St., San Francisco.

610 tons, two steam plants for Pacific Gas & Electric Co. at Avon and Martinez, Calif.; bids opened.

575 tons, bridge, North Broadway street, Columbus, O.

500 tons, Western avenue bridge, Chicago; Thomas McQueen, Chicago, low.

475 tons, library, Toledo, O.

435 tons, 15,000,000-gallon reservoir, Eugene, Oreg.; bids opened.

390 tons, reconstruct stilling basin, Calaveras dam, Sunol, Calif., for San Francisco; bids March 8.

380 tons, Connecticut river flood wall, Springfield, Mass.

375 tons, east side drive, New York, to Jones & Laughlin Steel Corp.; through A. M. Hazel Co. Inc., New York.

350 tons, over-crossing near Turlock, Stanislaus county, Calif.; general contract to Union Paving Co., 310 California St., San Francisco.

300 tons, group D buildings, state training school, Southbury, Conn., to Truscon Steel Co., Youngstown, O.; through E & F Construction Co., Bridgeport, Conn.

300 tons, mill run storm sewer, Steubenville, O.; Gailer Bros. Co., Cleveland, low.

288 tons, bureau of reclamation, invitation A-33,819-A, Buena, Wash.; bids opened.

192 tons, civic auditorium, Santa Cruz, Calif.; new bids opened.

175 tons, procurement division, treasury department, Newark, N. J., to Igoe Bros. Co., New York.

155 tons, bureau of reclamation, invitation 32,093, Ignacio, Colo.; bids opened.

150 tons, science building, junior college, Phoenix, Ariz.; bids opened.

140 tons, warehouse and industrial building, Tulsa, Okla.

140 tons, warehouse, Muskogee, Okla.

140 tons, treasury department, list 133, Los Angeles; bids opened.

114 tons, highway work in Cochise county, Ariz.; bids opened.

110 tons, school, Rahway, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through Auf-Der-Heide & Aragona Inc., Jersey City, N. J.

110 tons, superstructure, machine shop, specification 8995, Mare Island, Calif., navy yard; general contract to Barrett & Hilp, 918 Harrison street, San Francisco.

106 tons, highway work in Washoe county, Nevada; bids opened.

100 tons, under-crossing at Southern Pacific tracks, Riverside county, Calif.; bids March 2.

100 tons, school, East Bloomfield, N. Y.; Swartout & Rawley, Rochester, N. Y. low.

Pig Iron

Pig Iron Prices, Page 90

Pittsburgh — Pig iron sellers are encouraged by slightly better foundry operations and the decline in consumers' stocks. Prices are steady and unchanged with gradual disappearance of the last of low-price tonnages from sellers' books. Sanitary ware and jobbing foundries are somewhat busier, but heavy equipment builders are operating at a low rate and are expected to continue so for the present.

Cleveland — Pig iron releases continue to record a moderate improvement over January. Foundry

operations average approximately four days a week and further improvement is anticipated during March, reflecting a seasonal pick-up in operations among farm equipment and auto partsmakers. Indicating the gradual improvement in foundry operations, foundry coke shipments continue to record a steady increase. Some foundry interests have re-entered the market, but current buying is restricted to actual needs. Prices are unchanged.

Chicago—Sales of pig iron are small. Books will be opened for second quarter within the next two weeks. Daily rate of shipments is on a par with January, with total for the month expected to be slightly off. Coke shipments are improved and, in spite of this month being shorter than January, total shipments will show an increase.

New York—Local pig iron sellers believe that when all records are in, February will show a small gain over January. They anticipate a more substantial increase in March, particularly in view of a steady increase in machine tool production and also in building hardware. A betterment in soil pipe production should also transpire, as the spring season comes nearer to hand. Export business continues light.

Philadelphia—Improvement in the foundry melt is reflected in February coke shipments which are ahead of January and substantially heavier than a year ago. New orders are not large individually since consumers see no reason to cover ahead. Prices are steady.

Buffalo — Shipments remain close to the level of the past 30 days with production unchanged at 57 per cent of capacity. Foundry inventories of pig iron are low and operations vary. Machinery manufacturers are maintaining best schedules, with heating appliance makers showing a seasonal letdown.

St. Louis — The melt has declined slightly the past week or two, due largely to reduced operations at stove plants and jobbing foundries. This condition is regarded as temporary, recovery being looked for in March. Stove foundries report orders disappointing, particularly from mail order houses and wholesale hardware firms. Pig iron shipments are sustained, with February deliveries equal to or slightly ahead of January.

Cincinnati — Pig iron shipments and consumption show little change compared with January, best demand being for machine tool castings. Carload orders are more frequent, but principal consumers are covered for the quarter by last year's purchases. A moderate improvement in demand is indicated for March.

Birmingham, Ala. — A lull in the pig iron market is evident this week, according to reports from melters, with some slackening off in spot and future business. Not much of the product is being stacked. Fifteen furnaces are pouring, one down from the high mark since Woodward Iron Co. has taken out its No. 1 furnace for relining and modernization.

Toronto, Ont. — Sales hold to the improved level of recent weeks, but melters are interested only in spot needs. Individual sales average about 100 tons. Foundry operations are near 65 per cent of capacity, with weekly pig iron shipments averaging about 3500 tons. Higher consumption is indicated for the near future.

Scrap

Scrap Prices, Page 92

Pittsburgh — Scrap prices generally continue strong, supported by scant supplies of steelmaking grades. No. 1 heavy melting steel holds at $15.50 to $16, with a small tonnage sold recently at the latter figure. However, one mill in the market found tonnages limited at this price. Railroad lists scheduled for closing early in March include only small lots. Brokers look for more active consumer buying within a month and expect a higher market.

Cleveland—The scrap market is marking time while firmly maintaining prices. Supplies are being held closely and good melting material is scarce at current prices.

Chicago—Purchase of 25,000 tons of various grades of steel scrap by a leading consumer confirms the recent advance in quotations. Opinions vary as to the effect of the latest sale on the market, some interests believing that a softening will appear because no additional mill deman is in early prospect. Others indicate little change in the price of steelmaking grades is likely in the near future.

Boston—Activity is confined largely to buying of heavy melting steel against export orders. Domestic shipments are light. Export prices are firm but unchanged, while several cast grades for domestic delivery are inclined to weaken. Little

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scrap is moving to eastern Pennsylvania, with New England consumers buying in small lots.

New York—Domestic scrap business continues dull, with shipments light to both steel mills and foundries. Buying against old export orders is steady at unchanged prices. Material is coming out freely. Although not subject to much test, prices for domestic shipment are holding, with a few grades showing weakness. Specialties also are moving slowly.

Philadelphia—Prices display no further strengthening despite higher quotations in other districts. Some mills are operating at low schedules and others are fairly well supplied with scrap. However, one consumer of No. 2 steel may be in the market shortly, with the current range of $13 to $13.50 applying on the little business now going. Few lots of No. 1 steel are moving. E. G. Budd Mfg. Co. takes bids Feb. 27 on 3400 tons of compressed sheets and 450 tons of miscellaneous grades. Export movement is fairly brisk, with brokers covering at close to prices at which the material was sold.

Buffalo—Scrap prices are maintained despite absence of new business, but nominal values prevail. Sellers refuse to accept bids below $13.75 to $14.25 for No. 1 heavy melting steel. Fair tonnages are outstanding against old orders, but mills are restricting shipments. A few sales of cast scrap are reported within the quoted ranges.

Detroit — Dealers and brokers have no plausible explanation for the extreme dullness which has prevailed in the scrap market the past few months. In absence of a prospective marked upturn in steel buying soon, no immediate change is anticipated in scrap trading.

Cincinnati — Scrap prices are fairly steady in a dull market. Some shipments are being made against orders, but mills show little interest in buying and dealers resist lower offers for material on hand. Bids on recent railroad lists were moderately lower than a month ago.

Toronto, Ont. — Scrap shipments from rural areas have been retarded by the weather. To some extent this has restricted consumer deliveries.

Warehouse

Warehouse Prices, Page 91

Cleveland — Warehouse shipments are at about the rate a month ago, although in a few instances distributors note a moderate decrease in deliveries so far in February. A seasonal pickup is looked for early in March. Prices are steady, with no early revisions expected.

Chicago — A slight tapering in sales compared with January is regarded as normal for this month and fairly quiet business is expected until about the second week of March.

Philadelphia—Orders are slightly more numerous and larger individually. Prices also are improved, especially in cold drawn bars. New prices on galvanized sheets following partial elimination of the jobbers' functional allowance remain to be completely clarified.

Cincinnati — Sales have tapered after holding steady at a fairly high level for more than a month. Warehouses consider the letdown temporary and look for an upward trend early in March.

St. Louis — Sales are barely holding their own. Oil country goods still are active, and railroad shops are taking fair quantities. Country demand for rural goods, including fencing, is reported very quiet.

Tin Plate

Tin Plate Prices, Page 88

While tin plate demand is slow to increase and in some districts is less than expected, production has advanced slightly to 55 per cent. In the East some sellers doubt if February business will exceed the January volume. Export markets are particularly dull. Business is improved in the Middle West, where a further increase in production is in prospect soon at several plants. One mill there already is at capacity.

General line can demand accounts for most of recent tin plate tonnage, although sanitary can buying has started to appear. Production is heaviest in cold reduced plate. Prices are expected to continue $5, Pittsburgh or Chicago, per base box, although some interest is being shown in quotations at this time, since the current market was established only through first quarter.

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Also manufactured in "A", Pure Tin, "B", Tin and Lead, "C", Lead, "K", Low Melting Zinc and various other white metal alloys.
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American Solder and Flux Company
4519 Wayne Avenue
Philadelphia, Pa.

Iron Ore

Iron Ore Prices, Page 92

Cleveland—Consumptions of Lake Superior iron ore during January was 2,296,706 gross tons, compared with 3,040,700 tons in December but more than a million tons greater than in January, 1938.

Stocks at lower lake ports and furnaces Feb. 1 were approximately 7,200,000 tons less than on the same date last year. Lake Superior Iron Ore association's report follows:

	Furnaces	Lake Erie docks	Total
Feb. 1, 1939	26,646,130	5,042,775	31,688,905
Month ago	29,455,818	5,123,031	34,578,849
Year ago..	33,007,075	5,874,757	38,881,832

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 89

Bolt, nut and rivet business so far this month is steady or off slightly compared with January in most districts. In the East a small

gain is noted. Dollar volume has has been aided by the stronger market. Jobbers are buying consistently as a result of low stocks. A seasonal spurt in demand from the building and automotive industries is looked for soon, while railroad requirements for car work and track laying are expected to extend recent gains during the remainder of this half.

Steel in Europe

Foreign Steel Prices, Page 91

London — (*By Radio*) — Slightly better activity has appeared in the pig iron market in Great Britain. The steel industry is in much stronger position, owing not only to the rearmament program but also to quickening in normal trade channels.

Semifinished steel producers are busy and import quotas have been increased to meet home requirements. Most steel departments are busier, except those serving railways, shipbuilding and heavy structural requirements. Tin plate demand is much improved but galvanized sheets are dull.

Continental producers find export demand quieter and competition keen. Considerable inquiry is coming from China.

Steel cartel at its meeting in Paris discussed American competition and revision of Czech and Polish quotas, arising from modification of frontiers and also revival of Spanish production. Negotiations are reported under way by American exporters for sale of 25,000 tons of various steel products to Manchukuo, of which part already has been sold below official prices, perhaps by companies outside the cartel. American cartel members are said to have exceeded their quotas considerably.

Nonferrous Metals

New York—Activity in domestic nonferrous metal markets remained steady last week with no increased interest on the part of consumers shown. With the exception of "outside" copper and tin which eased, prices held unchanged.

Copper—The foreign cartel announced the production quota would be lowered to 95 per cent of basic tonnages as of March 1 from the 100 per cent rate which has prevailed since Jan. 1. Speculators in London and some interests here expressed disappointment that a larger curtailment was not made. As a result, foreign prices weakened. Export copper eased to around 9.95c, c.i.f., while resale copper was offered down to 10.25c and casting copper at 10.00c, f.o.b. refinery. All first hands continued to quote electrolytic at 11.25c, Connecticut. Weekly sales are still hovering around the 5000-ton level. Utah Copper Co. announced that, although its production recently was reduced 10 per cent, it is still in excess of what it has been for the last 10 years and that during the last three months the company has not sold 25 per cent of the copper produced.

Lead—Despite an increase of 1312 tons in refined stocks during Janu-

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Feb.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
18	11.25	11.37½	10.25	45.50	45.37½	4.75	4.60	4.50	20.00	11.25	35.00
20	11.25	11.37½	10.12½	45.45	45.37½	4.75	4.60	4.50	20.00	11.25	35.00
21	11.25	11.37½	10.00	45.35	45.22½	4.75	4.60	4.50	20.00	11.25	35.00
22—Holiday											
23	11.25	11.37½	10.10	45.40	45.40	4.75	4.60	4.50	20.00	11.25	35.00
24	11.25	11.37½	10.15	45.55	45.55	4.75	4.60	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.35-6.47½
Cleveland 6.75-7.00
Chicago 6.12½-6.37½
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.75-8.00
Chicago, No. 1 ..... 7.75-8.00
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.50-5.75

Light Copper

New York 6.62½-6.87½
Cleveland 6.00-6.25
Chicago 6.12½-6.37½
St. Louis 6.00-6.25

Light Brass

Cleveland 3.25-3.50
Chicago 4.00-4.25
St. Louis 3.50-3.75

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.25-3.50

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 6.75-7.00
Clips, soft, Cleveland 14.75-15.00
Mixed cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads . 10.50
Standard No. 12 aluminum . . . 12.75-13.25

Lee Conveyor SCREWS
are helically coiled bands of metal pitched to requirements, for welding to a shaft. Light in weight; great in strength, toughness and adaptability, they make a preferred method of constructing helical conveyor screws. Promptly available in low carbon steel for all ordinary applications or in 16-18% chrome steel for resistance to corrosion and abrasion. Other metals also available. You are invited to look into the possibilities of this preferred conveyor screw.
Write for Folder
Lee SPRING CO., INC.
30 MAIN STREET BROOKLYN N Y

ary, the market is in the best statistical position of all the major metals. A moderate turnover is reported each day with prices unchanged at 4.60c, East St. Louis.

Zinc—The unfavorable price situation in London continues to check any possible rise here. Sales were light last week at 4.50c, East St. Louis, for prime western. Galvanized sheet output, however, continues to rise gradually and is now around 59 per cent of capacity.

Tin—Improvements in the tin market situation include the lessening of selling pressure in the East and a slow expansion in plate operations in this country to nearly 55 per cent of capacity. Sales were light, however, as prices ranged from 45.35c to 45.55c.

Antimony—Sales were confined to small routine orders at unchanged prices. American spot held at 11.25c, New York, in cases.

Activities of Steel Users, Makers

(*Concluded from Page* 21)

Michigan and Toledo, O., area. B. J. Walter, formerly in charge of territory mentioned, is now associated with Deppmann organization. A. G. Bradbury, 2842 West Grand boulevard, Detroit, continues in charge of sales of other Roots-Connersville products. Messrs. Lee and Clark, 29 North Jefferson street, Chicago, have succeeded F. S. Salchenberger as turbine pump representatives in greater Chicago area. Hiram H. Haight, 2310 West Vliet street, Milwaukee, will cover the state of Wisconsin, and Ryan Corp., Nashville, Tenn., all central counties of Tennessee.

♦

John Lees division of Serrick Corp., Muncie, Ind., maker of industrial moldings, has introduced a line of decorative moldings for the architectural, general display and fixture fields. Christopher Tonne is manager of the new department.

♦

Lea Mfg. Co., Waterbury, Conn., has been appointed New England distributor for platers drying material, made by Maizo Mills, Circleville, O.

♦

Handy Governor Co., Detroit, maker of oil and air cleaners, governors and other automotive accessories, has been acquired by the King-Seeley Corp., Ann Arbor, Mich., and henceforth will be operated as a division of the latter organization, which also supplies automotive parts.

♦

Industrial division of Wailes Dove-Hermiston Corp., New York, has appointed the following distributors for its Bitumastic line of maintenance protective coatings: Robinson, Cary & Sands Co., St. Paul, Minn.; Stokes Engineering & Supply Co., Easton, Pa.; Strong, Carlisle & Hammond Co., Cleveland; C. W. Marwedel Co., San Francisco.

♦

Buffalo Bolt Co., North Tonawanda, N. Y., and Chicago Nipple Mfg. Co., Chicago, have become members of American Supply and Machinery Manufacturers' association, Pittsburgh.

♦

Assets and plant of Moloch Foundry & Machine Co., Kaukauna, Wis., have been purchased by H. B. Kraut, and a new company, to be known as the Kaukauna Machine Corp. has been organized. Incorporators are: H. B. Kraut, R. E. Hanson and R. J. Kraut, who has been made president. W. H. Roloff is vice president and general manager, and A. E. Mayer, purchasing agent. This firm has no connection with Giddings & Lewis Machine Tool Co., of which H. B. Kraut is president.

Equipment

Chicago—Machine tool sales have tapered somewhat here, although volume of inquiries has been maintained. At present, closings are fewer than in January, but prospects are good for improved business, as considerable work is pending and inquiries are active.

Cleveland — Machine tool and equipment orders have tapered slightly and February volume is expected to be slightly lower than January's. Sustained volume of inquiry indicates orders are awaiting only more definite indication that the upward activity trend will be resumed. Dealers are anticipating substantial increases in orders in the spring. Aircraft parts manufacturers are among the most active customers here, although the moderate buying is well diversified. Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, has been awarded broaching machine orders exceeding $55,000 by the government.

Construction and Enterprise

Ohio

CADIZ, O.—Village, G. C. Sheets, clerk, takes bids, due at noon, March 3, on contracts No. 3 and 4 in a waterworks project. Contracts involve three deep well pumps and pump house. Jennings-Lawrence Co., Columbus, O., engineer.

HUBBARD, O. — City, C. F. Harder, clerk, is taking bids due at noon, March 6, on Contract No. 2 in construction of 1,000,000-gallon capacity water softening plant, two turbines, two centrifugal pumps, mains, filter and chemical filters. Total cost estimated at $60,000. E. D. Barstow, Akron, O., consulting engineer.

MONROEVILLE, O.—Village, Clarence Zipfel, mayor, approved $42,820 bond issue at Feb. 14 referendum to finance construction of municipal light and power plant costing total of $78,180. Includes pump house, three diesel engines and five-ton crane. William C. Kammerer and associates, Cleveland, consulting engineers. (Noted Dec. 5.)

Connecticut

DERBY, CONN.—City is conducting preliminary survey for construction of a sewage disposal plant estimated to cost about $100,000. G. E. Thompson is city engineer.

Massachusetts

BOSTON — Commonwealth, metropolitan district commission, sewer division, W. E. Whittaker, secretary, proposes to build a $15,000 000 purification plant at its harbor. J. P. Dever, chief engineer.

New York

NEW YORK—American Gas & Electric Co., 30 Church street, will expend $25,000,000 during 1939 on new construction. Company controls Appalachian Electric Power Co., and Kentucky & West Virginia Power Co. Inc., both of Roanoke, Va.

ORCHARD PARK, N. Y.—City has PWA funds and takes bids early in March on construction of a sewerage system and sewage treatment plant costing $268,223. Industrial Planning Corp., Buffalo, consulting engineer.

WHITE PLAINS, N. Y.—Board of supervisors, Westchester county, plans to construct ten diesel engine electric power plants at total cost of $130,000. E. J. Kates, engineer, care of owner.

New Jersey

LINDEN, N. J.—Simmons Co. has plans for constructing a one-story factory building costing $80,000. W. L. Finne, Elizabeth, N. J., architect.

Pennsylvania

COLUMBUS, PA.—Lucas Mfg. Co. plans to build a fireproof factory and office building costing a total of $40.000 with equipment.

WAYNESBURG, PA.—Borough, K. W. Scott, secretary, plans to construct sludge beds, chlorinators and digestors, etc., at its sewage disposal plant. Total cost estimated at $50,000. C. C. McCall, borough engineer.

Michigan

BURTON, MICH. — Township board takes bids due at 7 p. m., March 8, on constructing a sewage lift station, force mains, sewer mains and manholes at cost of $240,000. Consulting engineer, Ora Gould, Flint, Mich.

GRAND RAPIDS, MICH. — Fisher Body division, General Motors Corp., is making sketches of a projected one-story stamping plant to cost approximately $500,000.

Indiana

MUNCIE, IND. — Indiana General Service Corp. has plans to expend $1,500,000 during 1939 in extending its distribution lines and improving its sub-

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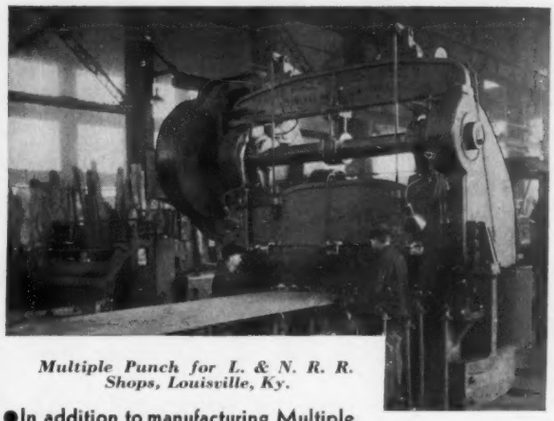

Multiple Punch for L. & N. R. R. Shops, Louisville, Ky.

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PITTSBURGH, PA.

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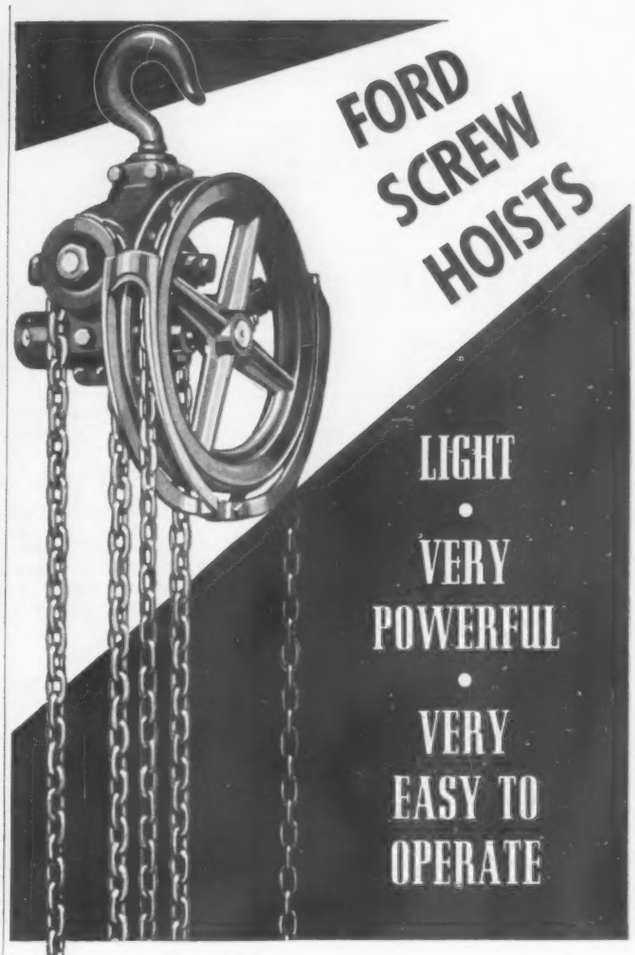

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Ford Screw Hoists are made on the worm-and-screw principle. They are selected for jobs where smooth operation is required—without the slightest jerking in starting and stopping. A continuous non-fouling hand chain permits operation from any angle.

Ford Screw Hoists are made in capacities from ½ to 10 tons.

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FORD CHAIN BLOCK DIVISION

PHILADELPHIA, PENNSYLVANIA

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In Business for Your Safety

Heading Specialists

Economy-minded **buyers of made-to-order screws and headed parts are discovering real savings in PROGRESSIVE cold upset products. They have found that many parts now milled from the bar can be headed efficiently and accurately with our modern equipment — at reduced costs. We invite you to submit samples or outline ideas to our specialists. Their advice — intelligently and promptly given — may show you the way to greater fastening economies.**

QUALITY PROMCO BRAND

The **PROGRESSIVE MFG. CO.**

TORRINGTON · · · CONNECTICUT

stations and power plants in four counties.

SCOTTSBURG, IND. — City proposes to build a sewerage system and sewage treatment plant costing $125,000. C. Hurd, Indianapolis, consulting engineer.

WABASH, IND.—Fawick Co. Inc. has filed papers of incorporation as a manufacturer of torque transmitting machinery, clutches, brakes, etc., with capital of $100,000. Incorporators are D. W. Maxon, S. C. Andress and R. M. Cobbs.

District of Columbia

WASHINGTON—Navy department, bureau of supplies and accounts, receives bids until 10 a. m., March 3, on motor-driven boring mill (schedule 5606), motor-driven radial drill (schedule 5607), motor-driven bench lathes (schedule 5610); and until 10 a. m., March 7, on grinding machine (schedule 5605), motor-driven knife grinding machine (schedule 5613), and motor generator sets (schedule 5614).

Kentucky

BURKESVILLE, KY. — City soon will receive bids on construction of proposed light, heat and power plant costing $65,000. J. L. Watkins, Lexington, Ky., is engineer.

LOUISVILLE, KY. — Jefferson county, care of M. Beauchamp, judge, plans to construct a steam power plant and electric distribution system to cost $90,850. PWA has allotted a grant. W. C. Wagner, Louisville, consulting engineer.

NICHOLASVILLE, KY. — City, W. R. Smith, mayor, plans to construct an $85,000 addition to its power plant. PWA has approved grant. J. S. Watkins, Lexington, Ky., consulting engineer.

Florida

POMPANO, FLA.—City has plans to extend its waterworks, including new lines, deep well and new storage tank. Project to cost $35,293.

Georgia

SAVANNAH, GA.—City has plans for constructing an industrial and domestic water supply for city and vicinity; may vote on proposal to finance with $1,000,000 bond issue.

Mississippi

UTICA, MISS.—Town, C. D. Barland, clerk, is receiving bids for three 75-kilovolt-amperes transformers and other materials and labor for constructing 4-wire transmission line.

Louisiana

NEW ORLEANS — Todd-Johnson Drydocks Inc. plans to build a boiler plant and reconstruct other plant divisions and install new equipment destroyed by recent fire causing $200,000 loss.

RUSTON, LA.—City, Charles Goyne, mayor, has applied to PWA for a grant in the construction of a water and light plant to cost $125,000. Program includes new building, 1000-horsepower engine and switchboard.

Virginia

BOYDTON, VA. — REA has allotted $120,000 to Mecklenburg Electric co-operative for constructing rural electric transmission lines serving 412 consumers in eight counties.

NORFOLK, VA.—Virginia Electric & Power Co., Robert J. Throckmorton, vice president, plans to spend $6,144,595 for purchase of new equipment and new construction during 1939.

Missouri

MACON, MO. — Macon Electric co-operative, W. M. Cross, president, has awarded contract to R. B. Potashnick, Cape Girardeau, Mo., at $414,813, for construction of 561 miles rural lines. Baumes Engineering Co., St. Louis, consulting engineer.

PALMYRA, MO. — City proposes to construct and equip a municipal light and power plant costing $66,836. PWA has allotted $30,000 grant. F. Beard, Kahoka, Mo., consultant.

Oklahoma

TECUMSEH, OKLA. — City has plans in progress for construction of a municipal power plant costing $40,758. PWA has allotted funds for the project. H. H. Mahler, Tulsa, Okla., consulting engineer in the work.

Wisconsin

LA CROSSE, WIS.—Trane Co., maker of heating and ventilating equipment, closes bids March 3 on construction of a one-story, 80 x 260-foot addition to its factory. Architects in charge, Parkinson & Dockendorff, La Crosse.

Texas

HARLINGEN, TEX.—City, Hugh Ramsey, mayor, proposes to build a sewage disposal plant costing $65,000 and will apply to WPA for funds to finance project. Alfred Tamm, city engineer.

Kansas

CLAY CENTER, KANS.—C. & W. Rural Electric co-operative, Fred Yarrow, president, will take bids immediately on construction of 275 miles of rural electric transmission lines in Clay county. R. H. Reed, Clay Center, consulting engineer. (Noted Dec. 19.)

MARION, KANS.—City, C. C. Brooker, mayor, will probably soon vote on proposal to issue bonds to finance installation of new diesel unit in its power plant.

ST. JOHN, KANS.—Ninnescah Rural Electrification co-operative, R. W. Goodman, secretary, has applied to REA for funds in projected construction of about 150 miles of rural electric lines. A. W. Hefling, Hutchinson, Kans., consultant.

North Dakota

GRAND FORKS, N. DAK.—City, C. J. Evanson, city auditor, takes bids to 7:30 p. m., March 7, on the improvement of its waterworks. Involves new filters, clarifiers, reservoir, wells and pumps. Lium & Burdick, Grand Forks, consultants.

Nebraska

ALLIANCE, NEBR. — City, Clarence Hoper, manager, is preparing plans for construction of a municipal power plant; will probably issue $300,000 bonds to finance.

COLUMBUS, NEBR.—Loup River Public Power district, Harold Kramer, secretary, takes bids until March 7 on equipment consisting of high-voltage transformers, oil circuit breakers and lightning arresters. Harza Engineering Co., Chicago, consulting engineer.

HARTINGTON, NEBR. — Cedar-Knox Rural Public Power district, Julius Tigges, president, is taking bids until 10 a.m., March 9, on construction of 125 miles rural electric transmitting lines in Cedar county. Certified check or bid bond 5 per cent. H. H. Henningsen Engineering Co., consultant. (Noted Dec. 19.)

TEKAMAH, NEBR. — Burt County Rural Public Power district, C. D. Beck, president, is taking bids until 10 a.m., March 13, on construction of 89 miles of rural electric power transmission lines in two counties. Certified check or bond 5 per cent to accompany bid. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant. (Noted Dec. 19.)

Iowa

MARION, IOWA—Linn County Rural Electric co-operative, Glen Stoner, president, has awarded a contract to Sandberg & Johnston Construction Co., Hampton, Iowa, at $137,999, for constructing 188 miles of rural electric lines. Will start work about March 1.

MARSHALLTOWN, IOWA—City, Anne McMahon, clerk, is taking bids to 8 p. m., March 6, on construction of outfall sewers and sewage treatment plant. Cost estimated at $463,636. Consoer, Townsend & Quinlan, Chicago, consulting engineers. (Noted Feb. 13.)

Colorado

COLORADO SPRINGS, COLO. — City will soon begin work on improvements in the municipal hydroelectric plant, including installation of a 2000-kilowatt hydraulic turbine and auxiliary equipment, at cost of about $470,000.

Wyoming

LARAMIE, WYO.—Bureau of reclamation, department of interior, Denver, is taking bids for delivery at Laramie three 2500-kilovolt-ampere transformers, one 15,000-volt station-type step-voltage regulator, three disconnecting switches and one 115,000-volt lightning arrester. Government will install equipment.

Montana

LEWISTOWN, MONT.—City council, George Waltz, clerk, has approved plans and is awaiting PWA sanction on construction of a projected sewage disposal plant to cost $55,000. J. M. Schmidt, city engineer. (Noted Dec. 19.)

Pacific Coast

LOS ANGELES—Fruehauf Trailer Co. has plans underway for constructing a 100,000-square foot trailer factory costing approximately $200,000.

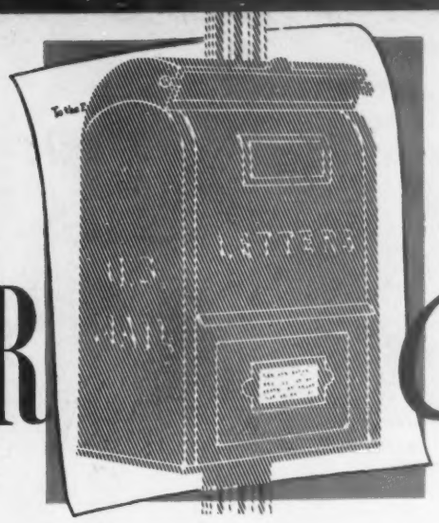
TACOMA, WASH.—City light department has plans to construct a new West-end power substation, for which $60,000 is available, and to purchase meters for which $25,000 is available.

Canada

AYR, ONT.—Ayr Tack & Nail Co. Ltd., M. Cabral, manager, has plans to construct a 68 x 135-foot extension to its factory building here.

LARDER LAKE, ONT.—Chesterville Larder Lake Gold Mines Ltd. is asking bids on construction of a 500-ton mill costing $100,000 at its Chesterville gold mine. Dowsett & Dunn, architects, care of owner.

SHERBROOKE, QUE.—Municipality, A. Deslauriers, clerk, soon will take bids on construction of a generator house costing $134,000. W. M. Veilleaux, city engineer.



READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Must Broaden Steel Uses

To the Editor:

In reference to industry's problems I believe there have been enough suggestions from all sources in the country, as a matter of fact too much, on the kind of legislation to encourage flow of capital. This has been much overplayed and nothing new, in my opinion, can be added to the situation, except to keep alive the subject itself.

As far as the steel industry is concerned, in my opinion, if we can broaden the uses of steel in new fields, particularly the construction of residences and things of that nature we will do more to help unemployment in the steel industry than almost any other manner that seems available at the moment.

FRANK PURNELL

President,
Youngstown Sheet & Tube Co.,
Youngstown, O.

Small Castings

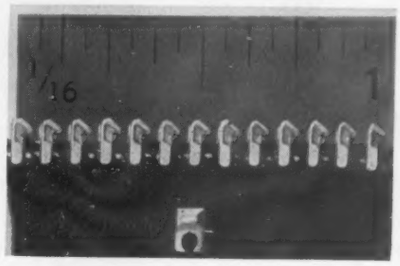
To the Editor:

Feeling responsible for having started, in the July 4, 1938, issue of STEEL, a series of letters on the smallest casting, we think that with the enclosed casting and photograph we can be in on the finish of this question.

These slide fastener elements weigh .022-gram or .00077-ounce. In other words, it takes 1290 per ounce or 20,640 of them to make a pound, as opposed to 772 per pound of the gray iron casting submitted by G. P. Albrecht in STEEL, Jan. 23, 1939.

The photograph shows there are 13 of these elements per inch, die cast of zinc alloy directly on the cloth tape, or a pound of the elements will be used on 1600 inches or 44 yards of tape.

This is truly a commercial accomplishment and hundreds of millions of these tiny castings have been produced by the Crown Fastener division of the Spool Cotton Co., New York.



Die castings 20,640 to the pound

C. R. MAXON

New Jersey Zinc Co.
New York.

"Read and Ponder"

To the Editor:

With reference to your correspondent, "Still Thinking," in your issue of Feb. 27, we would commend to his attention the extraordinarily able address made on the subject of "Price Policies and the Capital Goods Industries," by Dr. O. M. W. Sprague of Harvard University, Dec. 8, at the forty-third Congress of American Industry in New York.

His views apparently coincide with those of Dr. Sprague and it is believed that anyone having to do with price establishment in the hoped-for future, when American industry gets one jump ahead of the sheriff, will do well to read and ponder. This applies to any student of price structure.

W. W. ROSE

Executive Vice President,
Gray Iron Founders' Society Inc.,
Cleveland.

Editors' Note—Reporting Congress of American Industry sessions, STEEL, Dec. 19, p. 33, quoted Dr. Sprague as urging industry to strive to reduce prices, thus increasing real purchasing power of the low-income group. If prices are increased, he said, labor will want higher wages, and industry will not gain.

Looks at Other Side

To the Editor:

Referring to the letter by "Still Thinking" in STEEL, Feb. 27, regarding reducing prices as industrial activity increases from 70-75 per cent to 80-90 per cent, I agree this might work fine IF industry rises. But what would happen if it dropped back to 70 per cent? What if it should drop to 30 per cent?

Would increasing the price on a falling market not decrease sales and thus lower production, and then where would the system lead?

"ALSO THINKING"

Pittsburgh

. . . BECAUSE ITS QUALITY IS UNIFORM

In less than ten years after its formation in 1905, Weirton had grown from one small mill to the world's largest independent Tin Plate producer—a position it has held unchallenged for more than two decades through the uniformly maintained quality of its products. Today, Weirton offers you Weirite Tin Plate uniform in gauge, ductility and coating —a product widely recognized by its users as a material aid in their development of new business.

WEIRTON STEEL COMPANY · WEIRTON, W. VA.

DISTRICT SALES OFFICES: *Boston*, 1001 Statler Building; *Chicago*, 228 North LaSalle Street; *Cincinnati*, 2606 Carew Tower; *Cleveland*, 1217 Leader Building; *Detroit*, 11-210 General Motors Building; *Indianapolis*, Chamber of Commerce Building; *New York*, 405 Lexington Avenue; *Philadelphia*, 1462 Broad Street Station Building; *Pittsburgh*, 2800 Grant Building; *Rochester*, 45 Exchange Street; *St. Louis*, Cotton Belt Building; *San Francisco*, Sharon Building; *Toronto, Ontario*, General Assurance Building, 357 Bay Street.

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